The
Electrical Review

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The Fair and the Future

Vital Export Trade

THIS year the British Industries Fair opens in an atmosphere of uncertainty. Wars and rumours of wars have speeded up the tendency for nations to aim at self-sufficiency with the result that the interchange of goods and services has become more and more difficult. High tariffs, quota systems, subsidies and currency restrictions have all contributed to the slowing down of foreign trade and the process continues. It is becoming plain, however, that this downhill trend must be arrested. The world cannot go back to the conditions which existed centuries ago in the face of modern standards of living and the continued improvement of communications. Countries must be considered as a part of an economic system and not as isolated units.

Because of our position as one of the leading commercial and maritime powers we have been hit more severely than some other nations, although all have been seriously affected by the deterioration in international relations.

Retaliation or Agreement ?

The "political" handicaps to foreign trade can be met in one of two ways—by retaliation or by agreement. Although there are many advocates of the first, we cannot believe that trade "war" can bring anything but trouble to all the parties involved. The negotiation of trade agreements may be slow and difficult, but we consider that ultimately they are the better method. Although every industry may not benefit immediately all must eventually share in the general improvement.

If comprehensive commercial agreements between countries are not immediately possible, settlements may be arrived at by individual industries or by groups. A recent example is the conclusion of an arrangement between the British and German coal industries and another hopeful event is the projected meeting of German industrialists with representatives of the Federation of British Industries, including Mr. V. Watlington, the director of B.E.A.M.A.

Our commercial success during the past century or so has been based mainly on three principles: Investment overseas; pre-eminent quality; and originality of design and production. As to the first, investment within the Empire was attended more certainly by trade exchange than the lending of money to foreign countries. It has been suggested that loans to foreign nations should be conditional upon definite agreement that British goods shall be purchased. At present such arrangements are not always completely binding and British capital sometimes aids commercial rivals. Some think, too, that the interchanges between Great Britain and Empire countries are not always equitable. The Dominions, which enjoy special consideration in the Home market for their "primary" products, are anxious to develop their secondary industries which can often only be done with adverse effects upon the business of Home manufacturers.

Our maintenance of quality has put us at a disadvantage in relation to not-so-particular rivals who have persuaded many customers that a low initial price rather than efficient service is the thing to look for. This is an argument too powerful to be ignored by impoverished buyers and it is one which we have to meet either by superior salesmanship or by lowering our standards. As to design and production we are in the unfortunate position of having educated the industrialists of other nations and seeing our pupils starting upon their own—a thing which often happens in business. But we can still lead the world if we will, for British inventiveness and productive methods remain inferior to none. Research must be encouraged and properly financed.

The Purpose of the Fair

This brings us back to the Fair. It is in such times as these that its value is most apparent. In recent years the Fair appears to have become more of a display for home buyers than an opportunity for overseas visitors to see what British industry can do. This, of course, is a most useful function, but after all the main purpose of the Fair is to foster and expand our export trade.

There is encouragement in the fact that there has been an increase of 35 per cent. in the number of overseas buyers who have intimated their intention to visit the Fair. They are coming from sixty-seven countries including European States with whom, as a rule, trade is most difficult. It is to be hoped that the presence of these foreign visitors will afford opportunities for discussion of the wider aspects of foreign trade and help to open up avenues of approach to mutually beneficial agreements.

Electrical Research

RESEARCH has been the topic of the past week, prompted by the issue of the twenty-third annual report of the proceedings of the Committee of the Privy Council for Scientific and Industrial Research, which (as last week's summary indicated) reveals the remarkable scope of the twenty-one associations whose work is reviewed. Among them is the British Electrical and Allied Industries Research Association, now in its nineteenth year and enjoying an assured position built up on services rendered to an industry which, as Lord Stamp, the new President, pointed out at the annual luncheon, was born out of research to satisfy the created needs of an advanced civilisation. Since continued research is its natural sustenance, the industry must bear in mind that the help which E.R.A. receives from the Government is a direct reflection of its own self-aid. Last year the Association earned the maximum grant, and there has been a healthy increase in membership, better support from manufacturers being particularly gratifying, while contributions from the B.E.A.M.A. and allied industries have been restored to practically the same scale as before the financial crisis of 1931. But subscribed income still comes to hand rather late with respect to the heavy outgoings at the commencement of the year, and, moreover, the present reserve is altogether inadequate. It is now clear that the original D.S.I.R. anticipation that after receiving grants for five years the associations would have established themselves so securely that they could rely on their subscribing members to provide all the financial support they needed was far too sanguine.

A Large Increase

THE sudden heavy demands experienced by supply undertakings during the severely cold weather just before Christmas brought the prospect of onerous maximum-demand charges with little return, but the continuation of conditions of high consumption throughout January may do something to compensate undertakings for this. The monthly statement published last week by the Electricity Commissioners shows that the quantity of electricity generated by authorised undertakings attained the record total of 2,704 million kWh. This is equal to an improvement of 13.5 per cent. (322 million kWh) over the output for the corresponding period of last year. This rate compares with an average increase of only 6.4 per cent. last year.

Dealing with Shock

A WISE provision of the Factory Electricity Regulations is that instructions for the treatment of shock cases shall be posted up in all premises where electricity is generated, transformed or used at more than 125 V for AC and 250 V for DC installations. This provision has undoubtedly been instrumental in saving many lives, and there is nothing that gives us greater satisfaction than the part played for over forty years in promoting this end by the ELECTRICAL REVIEW'S "Suggestions for Dealing with Apparent Death from Electric Shock." In our last issue we mentioned that the familiar card is now available in a revised form. The revision is mainly in simplification of wording and has been made because, with the wider use of electricity for all purposes nowadays, it is essential that the principles involved should be easy to grasp by everyone likely to be concerned, whatever his educational attainments may be. We have had applications for copies of the card from educational institutions, which shows that the methods are being implanted in the young mind—an idea which could be more widely adopted.

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Minister of Transport's Preference

AN important pronouncement on the subject of trolley-buses was made by the Minister of Transport (Dr. Leslie Burgin) last week. He said that when petrol or Diesel vehicles were substituted for trams a blow was struck at the coal industry which provided the electric power. He appealed to the ten or twelve important provincial undertakings that were uncertain which type of transport to substitute for trams to look into the claims of the trolley-bus and said that if they came to him for loans he might be able to indicate his preference. Apart from the desirability of supporting the coal industry, trolley-buses have many inherent advantages, as Mr. J. H. Parker, M.I.E.E., clearly showed in our issue of January 27th, while the case for their use on grounds of national defence was categorically stated by Admiral Wilmot Nicholson at Manchester a couple of weeks ago.

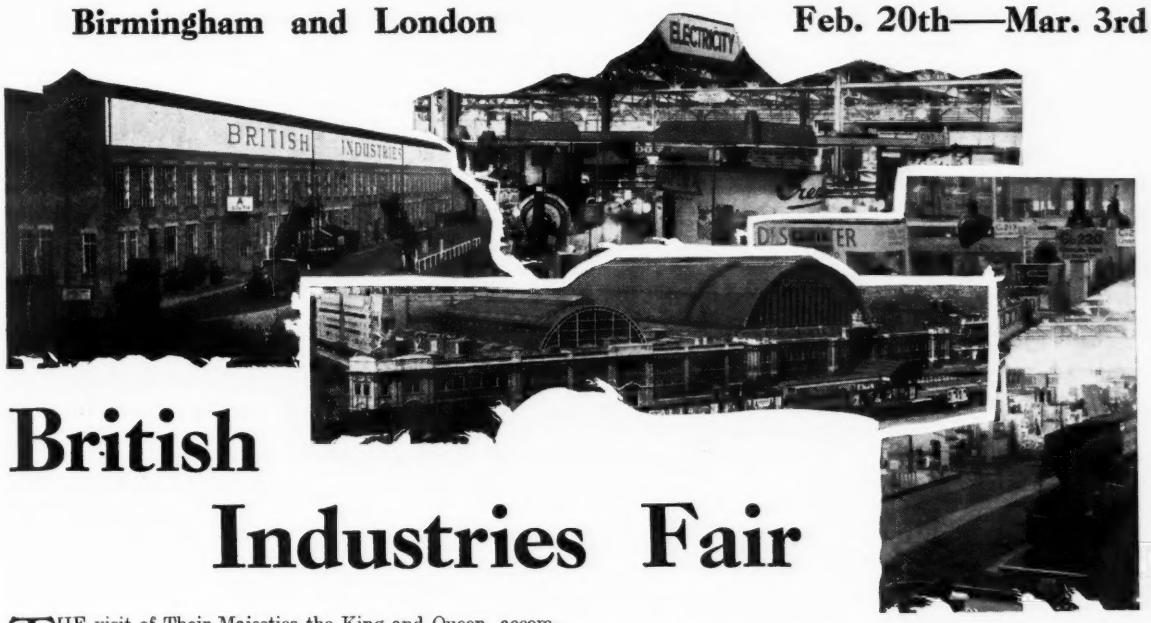
Trolley-buses and Bridges

THE first fruits of the modification in the Ministry of Transport regulations made to facilitate the operation of trolley-buses on routes under low bridges are to be seen at Reading. Through the reduction in the length of the safety tunnel generally prescribed for a two-axle chassis to that permissible with a three-axle chassis, the overall height of the trolley-bus becomes comparable with that of the oil-engined bus and standard upper saloons can be used. Other advantages are the reduced step height and the improved stability resulting from the lower centre of gravity. While the concession has been granted so far only for the Reading system, there seems no reason why the new clearance figures should not be sanctioned for general use, since there seems to be little reason for the considerable difference between the lengths allowed for the two-axle and the three-axle chassis. It is well to have avoided the low body with sunken gangway in the upper saloon by the facility now conceded of moving the position of the motor rearwards.

The I.M.E.A. Proposals

THE Council of the Incorporated Municipal Electrical Association held a special meeting last week to consider the proposals for amending the articles of association which was discussed at the extraordinary general meeting on January 26th. Unanimous agreement was reached upon certain amended proposals and these will be submitted to a further extraordinary meeting early next month. The smaller members will be given a somewhat greater representation on the Council and a certain representation has been guaranteed to the larger members. In informing us of the latest development Mr. A. J. C. de Renzi, who has championed the cause of the smaller undertakings, assures us that the March meeting will be more or less formal, as the proposals will be supported by the representatives of the Committee of Smaller Municipal Electricity Supply Undertakings. We congratulate the members of the I.M.E.A. Council on this common-sense decision to heal the breach which seemed likely to threaten the existence of the Association as a truly representative organisation.

Birmingham and London **Feb. 20th—Mar. 3rd**



British Industries Fair

[*Elec. Rev. photos.*

THE visit of Their Majesties the King and Queen, accompanied by the Prime Minister, will not only provide an added inducement to make March 1st the day for a trip to the Castle Bromwich (Birmingham) Section of the British Industries Fair, but it will also indicate the growing importance which the Engineering and Hardware Section is assuming in the industrial life and well-being of the Empire generally.

Every year the Fair makes new records. With 304,468 sq. ft. of exhibition space and literally miles of stands, the Birmingham Section will be the biggest ever held. Is is in fact claimed to be the largest trade fair ever held under one roof. There looks, too, as though there will be a record number of buyers from overseas, and a week ago almost a thousand more of them had intimated that they proposed to visit the Fair than at the corresponding time last year. Moreover, practically all the associations concerned with the various industries represented are organising special visits.

The arrangements of the exhibition generally will be much the same as in previous years, though a long-needed improvement in the catering facilities is promised. As a glance through our stand-by-stand guide on pages 226-244 will show, the electrical industry is even better represented than last year, and visitors to Birmingham will find something of electrical interest on approximately one out of every three displays there.

Rather more than half of the two hundred and fifty stands containing electrical apparatus are situated in the Electrical Section (Cb), where exhibits range from heavy industrial machinery to the small domestic appliances. Electrical exhibits in the other groups are mainly engineering and boiler house equipment, tools, machinery and such articles as inset fires built into mantel surrounds.

A special feature of the Fair this year will be displays relating to Air Raid Precautions. Outside the exhibition buildings there will be, in addition to one-man shelters for air wardens and key personnel, a concrete shelter sunk in the ground. Inside the Fair the exhibits, which will be found mainly in the Engineering Section, will comprise air-raid syrens; a film display showing the use of concrete for protection purposes; a sectional steel shelter; protective panelling and board; protection coverings and decontamination boilers; air-raid pumps; gas masks; gloves, &c.

The "Review" Stand

To assist visitors to find their way about and also to render any other service possible both to buyers and exhibitors, the ELECTRICAL REVIEW will once again have a stand (Cb. 218), situated in the same position as last year. Our staff representatives will be happy to answer inquiries, both personal and by telephone, the telephone number of the REVIEW stand being FAIR 110.

While most of the electrical exhibits are to be found at Castle Bromwich, there will be an interesting display at Olympia of many of the smaller appliances, such as vacuum cleaners, lighting fittings, clocks, razors and plastics. A few items of electrical interest will be included in the Earls Court Section.

The Fair will be open each day (except Sunday) from next Monday, February 20th, to Friday, March 3rd, from 10 a.m. to 6 p.m. at Castle Bromwich, and from 9.30 a.m. to 7.30 p.m. in London. The public are admitted each day at Birmingham and from 4.30 p.m. to 7.30 p.m. in London, except February 25th and March 3rd, when they are admitted throughout the day. Special train and bus facilities are provided for travellers to Birmingham and there is adequate car parking accommodation.

The Advisory Committee responsible for the organisation of the Electrical Section composed of the following representatives of the industry: Mr. A. Albrecht, director and secretary, E.W.F.; Mr. H. C. Lamb, president, I.M.E.A.; Mr. E. G. Batt, chairman, Heating and Cooking Section of B.E.A.M.A.; Mr. H. H. Berry; Mr. H. A. McGuffie, president, A.M.E.E.; Mr. A. C. Cramb, director, E.D.A.; Mr. R. Kilpatrick, president, E.C.A. of Scotland; Lt.-Col. W. J. Kent, Electrical Porcelain Manufacturers' Association; Dr. A. P. M. Fleming, president, I.E.E.; Mr. T. R. Martin, hon. secretary; Dr. A. H. Railing; Mr. C. W. Sully, director, E.L.M.A.; Mr. Walter Riggs, president, E.C.A.; and Mr. V. Watlington, director, B.E.A.M.A.

Official Visits

This committee has made the following arrangements for official visits to Castle Bromwich by various associations:—

Tuesday, February 21st (1 p.m.). Luncheon.
Institution of Electrical Engineers (South Midland Centre).
Incorporated Municipal Electrical Association (Provincial Centres).
British Electrical Development Association (Provincial).
Association of Steel Conduit Manufacturers.
Tramways, Light Railways and Transport Association.
Illuminating Engineering Society.
Electrical Contractors' Association, Inc. (Provincial).
Electrical Wholesalers' Federation (Provincial).
Association of Mining Electrical Engineers.
Speaker: Dr. L. Burgin, Minister of Transport.

Thursday, February 23rd (4.15 p.m.). Tea.
Electrical Association for Women (Birmingham and Midlands Branch).

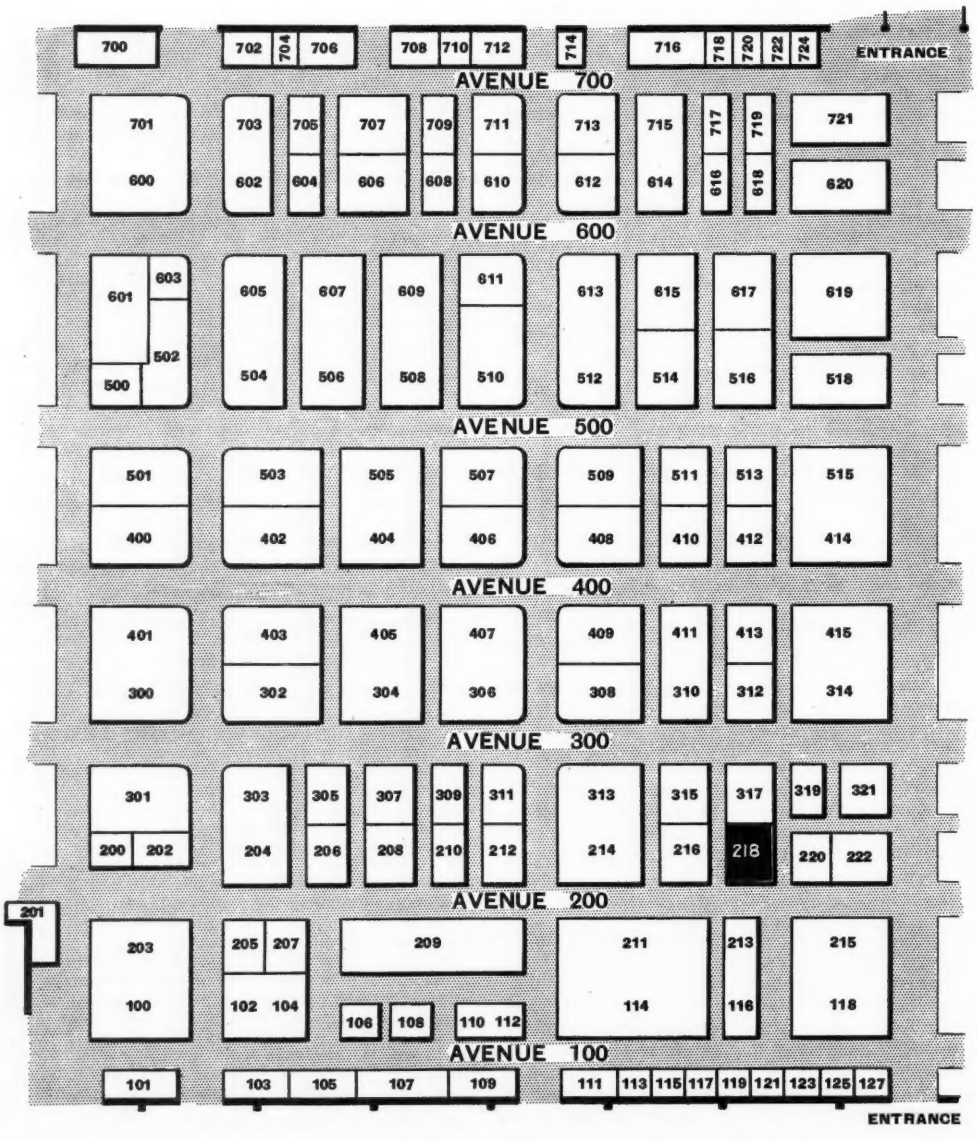
Saturday, February 25th (1 p.m.). Luncheon.
Electrical Power Engineers' Association.
Electrical Association for Women (Demonstrators' Circles).
Speaker: Lt.-Col. S. E. Monkhouse, managing director of the North-Eastern Electric Supply Co., Ltd.

Saturday, February 25th (4 p.m.). Tea.
Students' Section of the South Midland Centre of the Institution of Electrical Engineers.

Tuesday, February 28th (1 p.m.). Luncheon.
Institution of Electrical Engineers (Council).
Incorporated Municipal Electrical Association (Council).
British Electrical Development Association (Council).
Incorporated Association of Electric Power Companies.
Provincial Electric Supply Association.
London Electricity Supply Association.
Electrical Contractors' Association of Scotland.
British Electrical and Allied Manufacturers' Association (Council).
Electrical Contractors' Association, Inc. (Council).
Electrical Wholesalers' Federation (Council).
Association of Supervising Electrical Engineers.
Speaker: Mr. Herbert G. Williams, M.P., executive director of the Incorporated Association of Electric Power Companies.

The ELECTRICAL SECTION (Cb.) at Birmingham

Visitors to Castle Bromwich are cordially invited to visit the ELECTRICAL REVIEW Stand (No. Cb. 218) shown in black in the plan below. Our staff representatives will be in attendance there to render any service within their power both to exhibitors and buyers. The REVIEW'S telephone number is: FAIR 110



The British Industries Fair

List of electrical exhibitors

MOST of the exhibitors of electrical and allied products at Castle Bromwich (Birmingham) will appear in the Electrical Section (Cb), a plan of which appears opposite, but others will be found in the Hardware (A), Building (B), Gas (Ca) and Engineering (D) Groups. Apart from the few Earls Court stands indicated, all the London exhibitors will be at Olympia.

Birmingham

Accles & Pollock, Ltd. ... ... D 510
Ace Electric Co. ... ... Cb 113
Aeraspray Mfg. Co. Ltd. ... ... D 722
Aerograph Co., Ltd. ... ... D 227
Aiton & Co., Ltd. ... ... Cb 620
Allday, Wm., & Co., Ltd. ... ... Ca 609
Allen, Edgar, & Co., Ltd. ... ... D 719
Aluminium Industries, Ltd. ... ... A 615
Ashdowns, Ltd.... ... ... Cb 311
Avery, W. & T., Ltd. ... ... D 412 & 515
Avery-Hardoll, Ltd. ... ... D 412 & 515
Babcock & Wilcox, Ltd. ... ... D 300 & 401
Bakelite, Ltd. ... ... Cb 408
Baldwins, Ltd. ... ... Cb 222
Bank Hardware Mfg. Co., Ltd. ... A 224 & 329
Banks, Harry J., & Sons ... ... Cb 125
Barker & Turner, Ltd.... ... ... Ca 708
Beetle Products Co., Ltd. ... ... Cb 506 & 607
Belling & Lee, Ltd. ... ... Cb 702
B.E.N. Patents, Ltd. ... ... B 627
Berry's Electric, Ltd. ... ... Cb 209
Birmingham Battery & Metal Co., Ltd. D 506 & 607
Birmingham Electric Furnaces, Ltd.... Cb 214 & 313
Birmingham Electric Supply Dept. ... Cb 406
Black & Decker, Ltd. ... ... Cb 511
Blackwell, W., Oil Co. ... ... Cb 201
Bliss, E. W., & Co. ... ... Cb 615
Bowker, S. O., Ltd. ... ... Cb 317
Bratt Colbran, Ltd. ... ... Cb 617
Bray, Geo., & Co., Ltd. ... ... Cb 305
Britannia Batteries, Ltd. ... ... Cb 608
British Aluminium Co., Ltd. ... ... D 514 & 615
British Elec. Domestic Appliances (1938), Ltd. ... ... Cb 711
British Elecl. Development Assoc., Inc. Cb 306 & 407
British Industrial Plastics, Ltd. ... Cb 506 & 607
British Mechanical Productions, Ltd ... Cb 312
British Oxygen Co., Ltd. ... ... D 312 & 411
British Thermostat Co., Ltd. ... ... Cb 700
British Thomson-Houston Co., Ltd. ... Cb 404 & 505
British Trane Co., Ltd. ... ... B 321
British Vacuum Cleaner & Engineering Co., Ltd. ... ... Cb 205
Brook, J. A., Ltd. ... ... Cb 704
Bulpitt & Sons, Ltd. ... ... A 417 & Cb 516
Burco, Ltd. ... ... Cb 315
Cable Makers' Assn. ... ... Cb 300 & 401
Calorizing Corporation of Great Britain, Ltd. ... ... D 300 & 401
Canning, W., & Co., Ltd. ... ... Cb 118 & 215
Cardiff Corporation Development Cttee. A 500 & 601
Carron Company ... ... Cb 721 & D 701
Carter, H. W., & James, Ltd.... ... A 608
Cellactite & British Uralite, Ltd. ... B 522 & 623
Cellon, Ltd. ... ... B 529
Chloride Elec. Storage Co., Ltd. ... Cb 307
Clarkson Thimble Tube Boiler Co., Ltd. D 300 & 401
Cole, E. K., Ltd. ... ... Cb 611
Combi Electric Co., Ltd. ... ... Cb 117
Constructors, Ltd. ... ... Cb 508 & 609
Cotto Products ... ... A 326 & Cb 705
Coventry Machine Tool Works, Ltd.... D 524
Daniels, T. H. & J., Ltd. ... ... Cb 724
Danks, Edwin, & Co. (Oldbury), Ltd.... D 300 & 401
Delta Metal Co., Ltd. ... ... D 301
Deritend Stamping Co., Ltd. ... ... D 418
Desoutter Bros., Ltd. ... ... Cb 403
Dick, R. & J., Ltd. ... ... D 213
Dixon, R. G., & Co., Ltd. ... ... Cb 713
Dominion Machinery Co., Ltd. ... B 323
Donovan Elec. Co., Ltd. ... ... Cb 309
Dorcam, Ltd. ... ... Cb 710
Drew, Clark & Co. ... ... A 226
Earle, Bourne & Co., Ltd. ... ... D 500
Eaves, Thos., Ltd. ... ... Cb 302
ELECTRICAL REVIEW ... ... **Cb 218**
Electromagnets, Ltd. ... ... Cb 212
Elliott, E., Ltd.... ... ... Cb 413
English Electric Co., Ltd. ... ... Cb 512 & 613
E.R. Co. ... ... Cb 206
Erith's Engineering Co., Ltd. ... ... D 300 & 401
Ether, Ltd. ... ... Cb 716
Evenlite Tube Lamp Developments, Ltd. ... ... Cb 110
Firth Co., Ltd. ... ... Cb 216
Fitz-Gibbon & Murray, Ltd. ... ... Cb 111
French, W. T., & Son, Ltd. ... ... A 433
Fry's (London), Ltd. ... ... B 219
Fusarc Welding Co., Ltd. ... ... Cb 717
General Electric Co., Ltd. ... ... Cb 414 & 551
Gent & Co., Ltd. ... ... Cb 513
Gilman, F. (B.S.T.), Ltd. ... ... Cb 518
Girdlestone & Co. ... ... D 323
Gittings & Hills, Ltd. ... ... B 324
Gledhill-Brook Time Recorders, Ltd.... Cb 719
Gordon, James, & Co., Ltd. ... ... Cb 716
Greenwood & Batley, Ltd. ... ... D 212 & 313
Grosvenor Utilities, Ltd. ... ... Ca 707
Guest, Keen & Nettlefolds, Ltd. ... B 524
G.W.B. Electric Furnaces, Ltd. ... Cb 204 & 303
Hague & McKenzie, Ltd. ... ... Cb 400
Hall, B. J., & Co., Ltd. ... ... D 727
Harland Engineering Co., Ltd. ... Cb 503
Harvey, G. A., & Co. (London), Ltd. B 327
Hawkes, O. C., Ltd. ... ... B 407
Heayberd, F. C., & Co. ... ... Cb 618
Herbert, Alfred, Ltd. ... ... D 304 & 309
Higgs Motors, Ltd. ... ... Cb 619
Holden & Hunt ... ... Cb 602 & 703
Horstmann Gear Co., Ltd. ... ... Cb 610
Hotpoint Electric Appliance Co., Ltd. Cb 507
Hufton, Chas., & Sons, Ltd. ... ... A 414
Hurley Machine Co. (England), Ltd.... Cb 709
I.C.I., Ltd. (Degreasing) ... ... D 305
I.C.I., Ltd. (Heat Treatment)... ... D 204
I.C.I. Metals, Ltd. ... ... D 302 & 403
Iddon, Victor H., Ltd. ... ... Cb 127
International Combustion, Ltd. ... D 222 & 321
Ivor Power Speciality Co., Ltd. ... D 218
Izons & Co., Ltd. ... ... A 515
Jackson Electric Stove Co., Ltd. ... Cb 409
Johnson, Matthey & Co., Ltd. ... Cb 308
Johnson, Richard, & Nephew, Ltd. ... B 514
N. C. Joseph, Ltd. ... ... Cb 514
Kaufmann, H., Ltd. ... ... A 502 & 603
Kitchendom, Ltd. ... ... A 527
Lacrinoid Products, Ltd. ... ... A 628
Lan-Bar, Ltd. ... ... A 425
Laycock Engineering Co., Ltd. ... D 418
Ley's Malleable Castings Co., Ltd. ... D 402 & 503
Lister, R. A., Ltd. ... ... D 202
London Aluminium Co., Ltd. ... ... A 310 & 411
Lorant & Co., Ltd. ... ... Cb 714
Lucas, Joseph, Ltd. ... ... Cb 501
MacGregor & McCallum, Ltd.... ... Cb 112
Maclaren, Robert, & Co., Ltd. ... Cb 115
Macpherson, Donald, & Co., Ltd. ... B 527
Mansions Motor Co., Ltd. ... ... D 710
Mason, A., & Sons, Ltd. ... ... B 500
Mavor & Coulson, Ltd. ... ... D 620
M.C.L. & Repetition, Ltd. ... ... D 406
Metalectric Furnaces, Ltd. ... ... Cb 504 & 605
Metlex Industries, Ltd. ... ... A 512
Midland Fan Co., Ltd. ... ... A 612
Midland Metal Spinning Co., Ltd. ... Cb 410
Mirrlees, Bickerton & Day, Ltd. ... B 322
Modern Woodworking Machines, Ltd. B 320
Moffats, Ltd. ... ... Cb 509
Moorwoods, Ltd. ... ... B 410 & 511
Morecambe Elec. Equipment Co., Ltd. Cb 708
Moseley, David, & Sons, Ltd. ... D 630
Moss Gear Co., Ltd. ... ... D 420
National Time Recorder Co., Ltd. ... B 722
Neill, James, & Co. (Sheffield), Ltd. ... D 527 & 529
Newall's Insulation Co. ... ... D 521
Newton, L. H., & Co., Ltd. ... ... D 224
Nivex Instrument & Gauge Co. ... Cb 720
O.C.P. Marketing Co. ... ... D 718
Oldham & Son, Ltd. ... ... Cb 116 & 213
Omes, Ltd. ... ... D 419
Ormerods (Coventry), Ltd. ... ... D 105a
Ozalid Co., Ltd.... ... ... Cb 707
Packless Gland Co., Ltd. ... ... Cb 700
P. B. Sillimanite Co., Ltd. ... ... Cb 616
Peace, Henry, Ltd. ... ... Cb 612
Peglers, Ltd. ... ... B 421
Perkins Clean Milk Equipment, Ltd.... A 621
Permaheat ... ... Cb 718
P. & H., Ltd. ... ... Cb 501
Pinchin, Johnson & Co., Ltd. ... B 516 & 617
Pitter Gauge & Precision Tool Co., Ltd. Cb 312
Poles (1938), Ltd. ... ... Cb 508 & 609
Power Centre Co., Ltd. ... ... Cb 612
Prior Burners, Ltd. ... ... B 202 & 303
Pyrotenax, Ltd. ... ... Cb 712
Rapid Magnetting Machine Co., Ltd. Cb 412
Rawlplug, Ltd. ... ... Cb 210
Redmanol, Ltd. ... ... Cb 408
Revo Electric Co., Ltd. ... ... Cb 304 & 405
Rheostatic Co., Ltd. ... ... Cb 310 & 411
Riley Stoker Co., Ltd. ... . D 222 & 321
Robbins & Bradley, Ltd. ... ... Cb 500
Rotax, Ltd. ... ... Cb 501
Rowlands Electrical Accessories, Ltd. Cb 102 & 103
Rozalex, Ltd. ... ... Cb 722
Rubery Owen & Co., Ltd. ... ... D 602 & 703
Rudd, E., & Co., Ltd. ... ... Cb 200
Runbaken Electrical Products ... Cb 720
Sangamo Weston, Ltd. ... ... Cb 402
Scottish Development Council ... B 318
S. & D. Rivet Co. ... ... D 704
Sellman & Hill, Ltd. ... ... A 202 & 307
Serck Tubes, Ltd. ... ... D 608
Simmonds Aerocessories, Ltd. ... D 421
Simmons Holloware Co., Ltd. ... A 305
Simplex Electric Co., Ltd. ... ... Cb 314 & 415
Sipajlo, J. O. ... ... B 716
Small, W. R., Ltd. ... ... Cb 706
Smellie, James, Ltd. ... ... B 519
Smith Meters, Ltd. ... ... Cb 100 & 203
Sordovisor, Ltd. ... ... Cb 220
Spiral Tube & Components Co., Ltd.... D 713
S.S. Offset, Ltd. ... ... Cb 109
Standard & Pochin Bros., Ltd. ... B 420
Stein, John G., & Co., Ltd. ... ... D 303
Sterling Cable Co. ... ... Cb 119
Stewarts & Lloyds, Ltd. ... ... D 400 & 501
Stirling Boiler Co., Ltd. ... ... D 300 & 401
Stone, J. B., & Co., Ltd. ... ... D 231
Streetly Manufacturing Co., Ltd. ... Cb 506 & 607
Summerscales' Sons, W. & S. ... ... A 519
Taylor, Chas. (Birmingham) Ltd. ... D 612
Taylor & Challen, Ltd.... ... ... D 409
Taylor, Law & Co., Ltd. ... ... Cb 319
Tecalemit, Ltd. ... ... D 316 & 415
Teddington Controls, Ltd. ... ... Cb 700
Telsen Electric (1935), Ltd. ... ... Cb 106
Terry, Herbert, & Sons, Ltd. ... ... B 424
Thomas, Bertram ... ... Cb 321
Thompson, John (Wolverhampton) Ltd. D 410 & 513
Thorn Electrical Industries, Ltd. ... Cb 711
Timmis & Co., Ltd. ... ... Cb 603
Titanine, Ltd. ... ... Cb 606
Treforest Trading Estate ... ... A 500 & 601
Tube Products, Ltd. ... ... D 517
Tubes, Ltd. ... ... D 508 & 609
Tudor Manufacturing Co. ... ... Cb 119
Turner Bros. (Birmingham), Ltd. ... D 223
Turners' Asbestos Cement Co. ... Ca 301
United Steel Companies, Ltd.... ... D 512 & 613
Van Dorn Electric Tools ... ... Cb 511
Waddicor (Bradite), Ltd. ... ... Cb 208
Wakefield, C. C., & Co., Ltd. ... ... Cb 301
Walker, Jas., & Co., Ltd. ... ... D 422
Ward, H. W., & Co., Ltd. ... ... D 315
Westinghouse Brake & Signal Co., Ltd. Cb 510
Whitecross Co., Ltd. ... ... Cb 207
Whyte & Collins ... ... B 500
Wild-Barfield Electric Furnaces, Ltd. Cb 204 & 303
Wilkins & Mitchell ... ... Cb 604
Williams (Birmingham), Ltd. ... ... A 312 & 413
Williams, John, & Sons (Cardiff), Ltd. D 237
Winn & Coales, Ltd. ... ... Ca 206
Wolseley Sheep Shearing Machine Co., Ltd. ... ... D 705
Yorkshire Copper Works ... ... B 632 & 723
Zinc Alloy Rust Proofing Co., Ltd. ... D 732

London

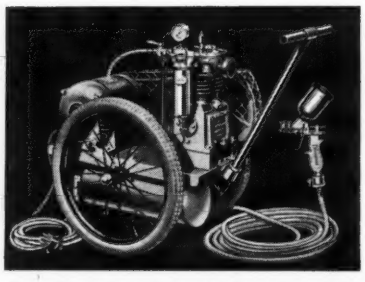
A.B.E.C., Ltd. ... ... D 1141
Abrahams & Co. ... ... D 1120
" Ardente," Ltd. ... ... A 699 & 704
Ashdown, H. E. (Birmingham), Ltd. A 741
Baird & Tatlock (London), Ltd. ... A 685 & 698
Bakelite, Ltd. ... ... A 763 & 769
Baker, Charles ... ... A 663
Baker Platinum, Ltd.... ... ... E 1212
Beatty Bros. Ltd. ... Earls Court 243 & 244
Belgrave Electric Co., Ltd. ... ... F 1376
Bellingham & Stanley, Ltd. ... ... A 657
Binger, O. D. (Sales Aids), Ltd. ... D 1121
British Alabaster & Arts Co.... ... G 1531
British Elec. Domestic Apps. (1938) Ltd. H 1654
British Plastics Federation, Ltd. ... A 773
British Vacuum Cleaner Eng. Co., Ltd. D 1137 & H 1655
Bylock Electric, Ltd. ... ... H 1666
Cable & Wireless, Ltd. ... ...Earls Court 219
Cole, E. K., Ltd. ... ... A 756
Crystal Glass Co. ... ... C 1059
De la Rue, Thos., & Co., Ltd. ... A 744, 755 & 802
Dent, R. H., Ltd. ... ... A 699 & 704
Dernier & Hamlyn, Ltd. ... ... F 1395
Dictograph Telephones, Ltd. ... A 784
Dominion Electrical Co. ... ... D 1122
Doughty, J. M., & Sons, Ltd. ... Earls Court 144
Ebonestos Industries, Ltd. ... ... A 743
Electric Art Shades (1928), Ltd. ... F 1353
Elliott, F. W., Ltd. ... ... D 1142
Elliott & Spear, Ltd. ... ... F 1360
Enfield Clock Co. (London), Ltd. ... D 1126 & 1129
English Clock & Watch Mfrs., Ltd.... D 1141
Erinoid, Ltd. ... ... A 740 & 759
Foster, A. E. ... ... F 1416
Franklin Lamp Mfg. Co., Ltd. ... F 1343
Garrard Clocks, Ltd. ... ... D 1135
General Chemical & Pharmaceutical Co., Ltd. ... ... A 671
General Post Office, ... Earls Court 218
Glazart, Ltd. ... ... F 1423
Grimshaw, Baxter & J. J. Elliott, Ltd. D 1139
Hanovia, Ltd. ... ... A 682
Hawkes, O. C., Ltd. ... ...Earls Court 553
Hilger, Adam, Ltd. ... ... A 679
Hoover, Ltd. ... ... H 1665
Hughes, F. A., & Co., Ltd. ... ... A 760 & 775
Hyders, Ltd. ... ... F 1414
Ideal Home Elec. Appliances, Ltd. ... A 700
Imperial Chemical Industries, Ltd. ... A 627 & 640
Insulators, Ltd. ... ... A 761
Jaffe & Rose ... ... F 1344
Johnson, Matthey & Co., Ltd. ... D 1236 & 1240
Kent Mouldings ... ... A 770
K.F.M. Engineering Co., Ltd. ... D 1131
Kitchendom, Ltd. ... ... Earls Court 424
Leek, E. & J., Ltd. ... ... E 1232
Lusty, W., & Sons, Ltd. ... ... F 1365 & Earls Court 178
Mallinson & Eckersley, Ltd. ... ... G 1533
Mayfair Shades, Ltd. ... ... F 1413
New Welbeck, Ltd. ... ... H 1656
Ozonair, Ltd. ... ... A 660
Pepper, Arthur J., & Co., Ltd. ... D 1117
Perivale Clock Mfg. Co., Ltd. ... D 1127
Perry Bevan & Co., Ltd. ... ... E 1219
Reliance Rubber Co., Ltd. ... ... A 719
Salter, Philip ... ... F 1420
Schick Dry Shaver (England) Ltd. ... E 1220
Scottish Development Council ...Earls Court 255
Shelley Potteries, Ltd. ... ... C 1026 & 1049
Smith's English Clocks, Ltd.... ... D 1141
Stadium, Ltd. ... ... G 1541
Stanley, W. F., & Co., Ltd. ... ... A 676
Thermega, Ltd. ... ... A 702
Waite & Son, Ltd. ... ... F 1345
Walker Fender Co., Ltd., ...Earls Court 186
Webb, Thos. & Sons ... ... A 811
Webber, P., Ltd. ... ... F 1397

Exhibits at Birmingham

Accles & Pollock, Ltd. (D. 510)
This exhibit will indicate the many uses of steel tubes. Samples of manipulated stainless steel tubing will be included.

Ace Electric Co. (Cb. 113)
Electric washing machines will include a model fitted with an automatic roll stop and draining board.

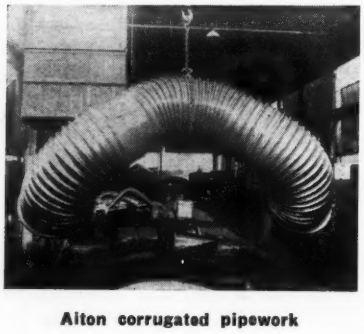
Aeraspray Manufacturing Co., Ltd. (D. 722)
Among a comprehensive range of compressors there will be a two-stage air cooled model shown mounted on fabricated steel base plate, with a 10-HP motor and drive, and coupled to separate air receiver. A new totally enclosed portable plant, comprising a vertical air-cooled twin-cylinder single-stage compressor direct-coupled to a 2-HP petrol engine, is designed for use with paint spray guns or small pneumatic tools, provision being made for storing these articles together with the necessary hoses in the interior of the machine. Other products of especial interest are a two-operator spray bench complete with exhaust fan and discharge ducting, numerous spray guns, and a printers' "Anti-Setoff" unit.



Aerograph "PW-1" electrically driven portable spray painting outfit

Aerograph Co., Ltd. (D. 227)
This display will comprise paint spray guns; pressure feed tanks; air compressors and receivers; air transformers and regulators; safety spray booths and vapour-proof light reflectors; exhaust fans for paint shops; air and fluid hose, including a new hose that is practically impervious to solvents; and complete portable spray painting outfits.
The type "PW-1" plant illustrated is a very quiet and handy outfit specially suitable for bronzing shop fronts and comparatively extensive spray-painting work in hotels, stores, offices, etc., where large or noisy plant could not readily be used. Its twin-cylinder air compressor has an automatic unloader and is driven by a 1-HP electric motor.

Aiton & Co., Ltd. (Cb. 620)
The flexibility obtained from Aiton corrugated pipework (illus.) used in the modern high-pressure high-temperature plant is claimed to be considerably greater than that obtained with any other type of expansion pipework of the same proportions, and a section will demonstrate the method of manufacture. Other exhibits will be the patent Corwel seal welded joint, steel alloy stud bolts, forged steel steam traps, cast iron pipes of any shape up to 72 in. bore, welded steel pipes to meet individual requirements, bellows expansion joints, a large corrugated crossover pipe, and a section through a butt welded joint. Photographs will illustrate the latest high pressure "P & B" feed water evaporator distillers.



Aiton corrugated pipework

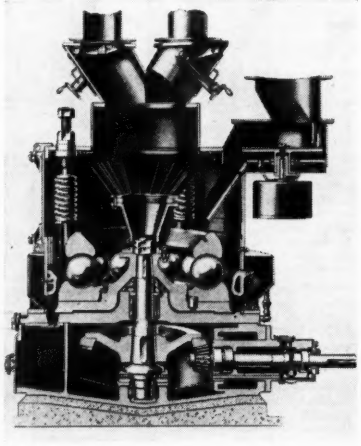
Edgar Allen & Co., Ltd. (D. 719)
"Stag Major Superweld" tools and "Stag Allenite" tungsten-carbide tipped tools will be accompanied by tungsten-carbide pellets for wire drawing dies and also dies made from Edgar Allen die steels. Small stainless steel castings, heat-resisting steel castings, manganese steel castings, etc., made in the company's own steel foundry will provide a further item of interest.

Aluminium Industries, Ltd. (A. 615)
Electric fires and kettles and a range of electric hotplate goods will be shown.

Ashdowns, Ltd. (Cb. 311)
Mouldings are made in every type of plastic.

W. & T. Avery, Ltd. (D. 412 & 515)
The latest development in weighing is the "A.1100" transporting unit recorder, consisting of the transposing unit, an electro-magnetic clutch, which is applied to the weighing spindle of a dial scale in such a way that no additional friction is added to the weighing mechanism. Demonstrations of the unit count machine will show its versatility, other machines to be seen in operation being the "No. 1410" direct reading hardness testing machine and the self-indicating universal testing machine for testing tension, compression, transverse, shearing and hardness. The Avery-Brownsdon wear and lubricant testing machine will also be on view.

Babcock & Wilcox, Ltd. (D. 300 & 401)
The new type "E" mill to be shown in operation, is installed or being installed in the Southwick, Upper Boat and Lister Drive power stations. Grinding is effected on the "ball-bearing" principle, and automatic control of its integral raw coal feeder enables the output to be regulated by a single adjustment of the primary air fan damper, while the absence of any considerable coal storage capacity renders the pulveriser extremely responsive, one test showing an increased and maintained steam flow from 100,000 lb. per hour to 276,000 lb. per hour in less than three minutes. Power consumption is claimed to be reduced by about 50 per cent., as compared with practically every other pulveriser on the market.



Sectional elevation of a Babcock & Wilcox type "E" mill

A special exhibit will demonstrate the work of the company's research department, items of particular interest being: photographs of the new bomb combustion method of determination of carbon and hydrogen, a small model of the Babcock rotating sampler, a specimen of a modified gas sampling tube, and photographs and models of pyrometer gear. A macro section of a handhole fitting indicating flow lines in the forging will be shown, together with photographs of staggered headers under fatigue test. A display of flash welded tube samples will cover the flash welding of boiler, superheater and economiser tubes.
Babcock "Calorized Diamond" and the Babcock-Clyde single nozzle soot blowers, will be shown electrically driven, and the Babcock-Erith flue type stoker will again be represented. Examples of the products of Edwin Danks & Co. (Oldbury), Ltd., will include a section of electrically welded gas separator, a large sized heat exchanger, and boiler drum ends. The Calorizing Corporation of Great Britain, Ltd., will have typical manufactures in "Calorized" mild steel and "Calmet" nickel chrome heat-resisting alloy, while photographs and drawings will describe the Clarkson Thimble Tube Boiler Co.'s concentric thimble-tube boiler for use as composite oil-fired and exhaust gas boilers and as vertical two-pass boilers for ordinary fuel firing.

Bakelite, Ltd. (Cb. 408)
An animated display will show how paints based on "Bakelite" resin resist attack by normally corrosive agents. Several metal plates protected with these finishes will be automatically immersed in, and withdrawn from, a 5 per cent. solution of caustic soda. Bakelite decorative sheet will play an important part in the construction of both the Birmingham and London stands, and individual exhibits will indicate the wide colour-range available. A recently developed electrographic process enables enlargements of any original in colour or monochrome to be reproduced. Two other devices in London which will catch the eye are a kaleidoscope and special colour-matching apparatus. For slow-running shafts, bearings in "Bakelite" laminated material have many advantages over phosphor bronze, white metal or similar types of liner. Various gears in "Bakelite" will also be represented together with a selection of mouldings, electrical insulating varnishes, lacquers, cements, etc.

Baldwins, Ltd. (Cb. 222)
Among steel sheets and made-up articles will be high grade steel sheets for signs and all classes of enamelled goods, electrical steel sheets for dynamo and transformer work, and electrical steel stampings, including completed assemblies, finished laminations ready for assembly in stators and rotors, various transformer types, and segmental stampings.

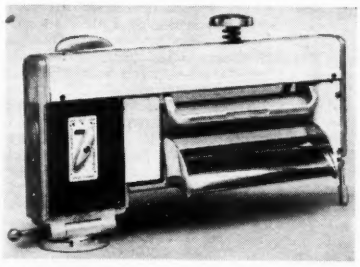
Harry J. Banks & Sons (Cb. 125)
Galleons, knights, figureheads, dolphins, seals and other figures, all of cast brass, are novel features of an attractive range of lighting fittings, of pendant, wall bracket, table and newel post types. In the galleon wall bracket illustrated below, the sails are of glass, with the port holes in the flame lacquer; there is a pendant fitting to match. Both antique brass and chromium plated finishes are available.

A 3-light ceiling fitting (O. C. Hawkes) and a galleon wall bracket (Harry J. Banks & Sons)

Barker & Turner, Ltd. (Ca. 708)
A two-speed cantilever action wringer (illus.) is a recent improvement to the "Bar-Spot" heated washing machine. An adjustable coil pressure spring with the pressure applied to the rolls by cantilevers is employed, together with a two-speed swivelling and hinging head, the speeds being operated by a simple turn-button control. A sensitive positive pressure release with automatic resetting

machine-cut gears, and stainless steel detachable trays are other features.

The washers themselves incorporate reciprocating tanks. This permits them to be used for any boiling purpose in



Wringer of Barker & Turner washing machine

addition to washing. All the "Bar-Spot" machines, including hand-operated models, are obtainable with a 3-kW plate heater consisting of six independently clamped and renewable 500-W elements controlled by a 3-heat rotary switch.

Beetle Products Co., Ltd. (Cb. 506 & 607)

See "British Industrial Plastics, Ltd."

Belling & Lee, Ltd. (Cb. 702)

A feature of a comprehensive exhibit of radio interference suppression apparatus for electrical machinery, both at the source and listeners' end, will be a display piece demonstrating both aurally and visually the effect of suppressors. Actual models of the "Skyrod" aerial will be shown on full-size chimneys, and one will be demonstrated from a 40ft. mast outside the exhibition buildings. Plugs and sockets, connections, cables, fuses, fuseholders, and Air Ministry samples are also represented, together with components suitable for high voltages.

B.E.N. Patents, Ltd. (B. 627)

Spray painting equipment will comprise spray guns, paint containers, air cleaners, exhaust fans, etc. The spraying machines will include both fixed and portable plants. With the new "Varispray" gun the operator can vary the width of the spray or change from fan to round form without interrupting the spraying operation.

Other exhibits will be single- and two-stage air compressors for working pressures up to 200 lb. per sq. in.; a self-contained motor-driven compressor set equipped with air receivers and automatic switchgear; "Anti-Set-Off" spraying machines for the printing trade; and a pedestal outfit operating from a central compressed air system.

Berry's Electric, Ltd. (Cb. 209)

This company's main exhibit will consist of examples of fires, water heaters, lighting fittings and switchgear, and to draw attention to the new season's fires use will be made of automatic salesmanship apparatus. Among new lighting fittings, of both modern and period designs, will be a flower-illuminating table (illus.). Water heaters will be demon-

Flower illuminating table (Berry's Elec.)

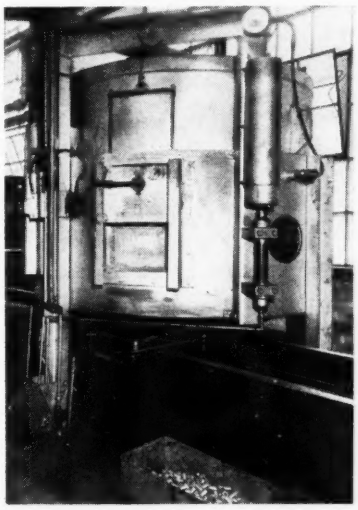
strated under practical conditions, and some of the heavy current switchgear will be in operation.

Birmingham Battery & Metal Co., Ltd. (D. 506 & 607)

Polished metals of the company's own manufacture are to be used in the construction of this stand, which will display prominently seamless copper tubes up to 24 in. inside diameter. Pillars will consist of specially finished copper tubes for water and heating services, and also condenser tubes of cupro-nickel and aluminium-brass. The central office is to be walled and panelled with copper, brass, phosphor bronze, and gilding metal sheet. Specimens of "B.B." products will include condenser and superheater tube, extra large plates for condensers, coils of copper tubing for panel heating, compression joints, rods, sheet, wire and ingots.

Birmingham Electric Furnaces, Ltd (Cb. 214 & 313)

A compact new type of clean-hardening furnace (illus.) for continuous production of small parts, to be shown working, is economical and simple to operate, and gives a very clean finish, with complete absence of decarburisation. Either oil or water quenching can be used. Of smaller size than previously available, a new continuous belt-conveyor furnace for automatic brazing or bright annealing should be useful to concerns whose production does not justify the installation of a large plant. The new "Birlec Lectrodryer" automatic unit for dehumidification in air-conditioning systems is designed for long periods of continuous use without attention. The display also comprises a bureau of technical information on furnace practice. Sample products from "Birlec" furnaces are on view, to-



"Birlec" 35-kW furnace for continuous scale-free hardening of small parts

gether with photographs and literature dealing with typical equipment.

Birmingham Electric Supply Department (Cb. 406)

An inquiry bureau will furnish particulars of tariffs and facilities offered, while the history and development of the undertaking will be depicted in pictorial graphs and illustrations. A film will be an additional attraction.

Black & Decker, Ltd. (Cb. 511)

This company, which acts as distributor for "Van Dorn" electric tools, will be showing drills from 3-16 in. to 1 in., including the ¼-in. and ½-in. "Junior" models for general service and repair work, and the new "Holgun" (illus.), with its flexible drive and angle drive attachments. The "Holgun" has been designed for drilling in awkward positions where a low spindle offset is an advantage.

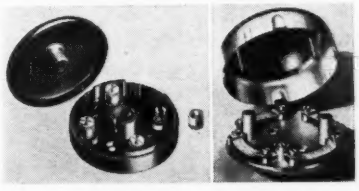
Drill stands for converting portable drills into accurate drilling machines, screwdrivers, nut runners, tappers, sanders, vitrifiers, bench and portable grinders, the "Valve Master" wet grinding valve refacer and the "Vibro-Centric" valve seat grinding method will be demonstrated. Among other portable electric tools will be the 16 and 18 gauge "Lectro-Shears," for cutting steel and other sheet materials, the "No. 35" portable trim saw, and the 7-in. portable electric saw. "High Cycle" tools are available for continuous performance in mass production work.

W. Blackwell Oil Co. (Cb. 201)

"Nulsec" lubricating oils include transformer oil Class A and B, to B.S. specifications; turbine oil, with a demulsibility of only 20-25 secs.; electric "Motoroil"; and dynamo oil. "Vicol" soluble cutting oil ensures clean cut, preserves cutting tools, and prevents rust.

S. O. Bowker, Ltd. (Cb. 317)

To the "Tenby" wiring system has been added a new round junction box



Bowker "LT.5 and B.7" junction boxes

(illus.) for lead-covered cable, incorporating several practical improvements. An improved terminal with a large cable capacity fitted to one of the company's c.t.s. junction boxes will be especially useful on cooker, water heater, etc., circuits. "Tenbyluxe" and "Tenby Pilot" switches are now available in nearly thirty attractive colours,

Bratt Colbran, Ltd. (Cb. 617)

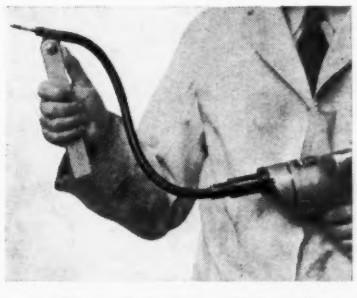
An extensive range of "Solectra" inset and portable radiators will be accompanied by convectors and a number of electric suites incorporating either complete mantels or surrounds, and panels. In the original "Sunrise" (illus. p. 229) the imitation fuel itself glows hot from concealed elements behind, dust particles, cigarette ends, etc., being actually consumed. Another new radiator, the "Three-way," besides projecting radiant heat in the room over a wide area, produces circulation of warm air by means of a special ventilating system. Other models worth special mention are radiators interchangeable with existing coal fires and the company's most popular unit, the "No. 146," which is now available with a chromium-plated front. A 2-kW version of the "Flamingo" fire is another innovation.

Geo. Bray & Co., Ltd. (Cb. 305)

Besides an extensive display of "Tubalox" and "Chromalox" electric heaters, there will be various industrial units, including air heaters, bank-type immersion heaters, sterilisers, and portable immersion heaters. The "Tubalox" element will be formed into patterns indicating its uses. Refractories will comprise special parts and plain and screwed rods and tubes.

Britannia Batteries, Ltd (Cb. 608)

Stationary batteries will include open-type cells with "short-first-charge" plates; sealed types supplied fully charged; cells having double glass boxes



Black & Decker "Holgun"

which avoid interruption of the circuit in case of a box being damaged; cells in lead-lined wood boxes; and small cells used for private telephone installations, meter testing, clock circuits and similar duties.

Train-lighting cells to be shown with lead-lined wood and glass boxes are extensively used on the British railways. A feature of the Britannia tubular

Oldham hand lamp and detector and a Britannia vehicle tubular cell

vehicle battery (illus. above) is the tubular construction of the positive plates, which gives them great mechanical strength and freedom from buckling. The same construction is used for marine batteries for lighting, steering-gear operation, wireless signalling, etc. The tubular batteries for sound-film work have a much longer life than ordinary pasted-plate cells.

British Aluminium Co., Ltd. (D. 514 & 615)

The stand itself will illustrate some of the architectural and decorative applications of aluminium, while show-cases will demonstrate some of the uses to which the metal and its alloys are now being applied. Over 20,000 miles of steel cored aluminium conductor are in use on the grid system, and visitors will see samples that have been in service up to twenty-eight years. Extruded sections in pure aluminium and aluminium alloys can now be produced in a wide variety of shapes and sizes at a relatively low expenditure on tools. The "Brytal" finish for aluminium reflectors is now well established for electric fires, and public, commercial and industrial electric lighting. Specimens that have undergone prolonged exposure to heat and to an industrial atmosphere will be seen. Silver and coloured anodic finishes combine attractive appearance with outstanding durability.

British Electric Domestic Appliances (1938), Ltd. (Cb. 711)

Noteworthy among the current range of "Mary Ann" appliances are the streamlined, seven-heat thermostatically controlled iron; a table cabinet washing machine; an upright vacuum cleaner; and the "Handie" hand cleaner. The well-known cylindrical type "Mary Ann" and "Bedalax" cleaners will also be displayed.

British Electrical Development Association (Cb. 306 & 407)

At the E.D.A. information bureau visitors will be able to obtain particulars of all aspects of electrical applications and of the Association's various publications. All the facilities of the stand will be at the service of members.

British Industrial Plastics, Ltd. (Cb. 506 & 607)

This company will be showing steel moulds and dies, while its subsidiary, the Beetle Products Co., Ltd., will have examples of "Beetle," "Pollopas" and "Scarab" moulding powders, and also "Beetle Transparent." In addition to mouldings made by customers from these materials, there will also be specimens of the work of the companies' moulding associate, the Streetly Manufacturing Co., Ltd., including such items as electricity meters, electrical fittings, switch plates, fuse boxes, radiator handles, vacuum cleaner parts, radio cabinets, scale housings, clock cases, containers, and lampshades. The stand will be panelled with urea sheets.

British Mechanical Productions, Ltd. (Cb. 312)

The new "Clix" foot-press-button switch-socket (illus.) has in place of the usual dolly a press-button set at an angle convenient for operation by slight toe pressure applied vertically. The action alternately throws the mechanism to "on" and "off" positions, which are shown by a red-green indicator. Shutters are an optional feature. Complete and sectional models will demonstrate the sturdy mechanism and the simple method of fixing, including automatic earthing.

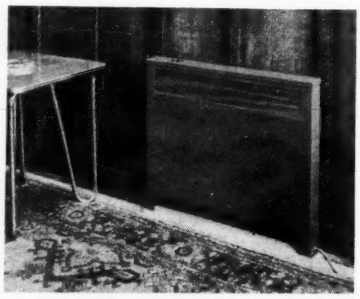
The "Clix Flexipin" plugs, well known in the radio industry for the good contact they ensure, are now available for all electrical purposes. Features of a flanged flush socket (illus.) are its circular shape, attractive finish, one-piece construction for quick fixing, and resilient floating sockets suitable for all B.S.S. plugs. Other lines worth inspection are the "Clix Safeways" adaptors, and the "Clix" radio components. The Pitter Gauge and Precision Tool Co., Ltd., an associated company, will display precision instruments, tools and gauges.

British Oxygen Co., Ltd. (D. 312 & 411)

Attention will be concentrated on the latest methods of oxy-acetylene welding and cutting. A 55-in. universal machine will be seen cutting through steel 14 in. thick at the rate of a foot in less than five minutes, while the 36-in. and the portable straight line and circle cutting machines will be demonstrated preparing steel plates for welding and stack cutting. An ultra-speedy hand cutter for cutting sheet metal down to 1-32 in. thick cleanly and without distortion is a new product. Demonstrations of "Rightward" welding and "Lindewelding" will be accompanied by lantern slides.

British Thermostat Co., Ltd. (Cb 700)

This stand, which will cover the products not only of this company but its associates, Teddington Controls, Ltd.,



British Trane electric "Vectair"

and the Packless Gland Co., Ltd., will include panels displaying "Teddington" automatic controls for heating, air-conditioning, refrigerating and industrial installations. Smaller exhibits, such as seamless metallic bellows and small parts, will be seen under glass-topped counters.

Among room thermostats and duct thermostats, humidistats, magnetic and motorised valves, and motor-operated damper units, is the new "HS" humidistat, an improved version of the "HH" model. Refrigeration controls will include a special display of ice-cream cabinet controls, and a demonstration is to be arranged to show the "Teddington" thermostatic expansion valve in operation. The "Teddington" controlling pyrometer to be shown for the first time, is claimed to be the simplest controlling pyrometer produced. It has a wide range of industrial applications.

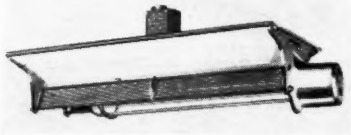
The new "CY" dry-contact relay (illus. p. 238) has been developed primarily for use under conditions where impulsive or oscillating motion precludes the use of a liquid-filled switch. It comprises essentially a glass switch tube which makes and breaks the main circuit, operated by an electro-magnet placed vertically above it and controlled

Flanged sockets and a press-button switch socket (British Mechanical Productions)

by a permanent magnet situated immediately beneath it. It is designed to make and to break currents up to 10 A at voltages up to 250 V, AC or DC.

British Thomson-Houston Co., Ltd. (Cb. 505 & 404)

This stand has been designed to exhibit the latest developments in lamps and the science of illumination. Vertical columns, glazed at each side and internately illuminated, throw the light from concealed "Mazda" lamps upon recessed panels containing "Mazda," "Mercra" and "Sodra" lamps. Four towers or pylons carry suspended lanterns, two illustrating street lighting practice (illus.) and two industrial and



B.T.H. "Sodra H" lantern

floodlighting; similar fittings on the bases can be examined closely by visitors. Photographs of recent B.T.H. installations will also be shown.

The interior of the stand, while serving as an office, has photographic transparencies of various lighting installations on the walls, with recesses in which will be seen the chokes, control gear, and other appliances pertaining to each particular unit demonstrated outside. A table will be surmounted by artificial flowers treated with fluorescent media which glow in the rays from hidden "Mercra" ultra-violet lamps. Fluorescence will also be a feature of the ceiling decoration.

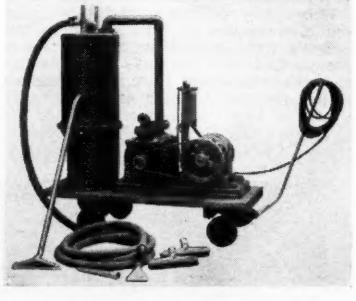
B.T.H. sound amplifying equipment will again be installed in the Royal Room, Bradford Room and the Conference Room. It will consist of amplifiers of 10W output for each position, moving coil microphones and permanent magnet curved cone speakers.

British Trane Co., Ltd. (B. 321)

Electric "Univectair" unit convection heaters will be demonstrated, together with "Vectair" convection heaters (illus.) in various types and finishes; "Vectair" air heating batteries in typical sizes and arrangements; a suspended type "Univectair" cooler for dehumidifying and air conditioning; and the "Vectair" ventilating grille with 85 per cent. free area and obscurity to vision.

British Vacuum Cleaner & Engineering Co., Ltd. (Cb. 205)

Suitable for large buildings and capable of accommodating three opera-



B.V.C. "TO6/58" portable industrial vacuum cleaner

tors working simultaneously, the "BO13" vacuum cleaner incorporates a 6-BHP electric motor mounted on a cast-iron baseplate with a "C" type dust filter having an easily detachable dust-bucket at the base. The piping is carried throughout the building with hose connection points wherever needed. The "TO6/58" portable model (4-BHP motor) is mounted on a heavy trolley with swing forecarriage and drawbar handle. This robust plant is suitable both for floors and upholstery (two or three operators). A useful one-operator equipment is the "T6" (1½-BHP motor), which is used very largely for upholstery. The lightest industrial type made, the "T3," has a built-in universal motor and is most suitable for small fac-

tories and offices, as well as for ships. A full range of "Goblin" domestic cleaners and the "Popular" washer will also be exhibited.

J. A. Brook, Ltd. (Cb. 704)

So convinced is this company that its "Lox-all" universal electric lamp locks will effect a very big saving in electric lamp bills that it offers to take them back if the results are not satisfactory.

Bulpitt & Sons, Ltd. (A. 417 & Cb. 316)

Among "Swan Brand" appliances, special attention will be drawn to electric kettles, irons, toasters, fires, tea urns and medical sterilisers. Features claimed for a new type of element and safety device incorporated in the kettles are lower servicing cost, longer life, quicker operation of the safety device, and more robust construction. The new device is interchangeable with the old one. An exhibit of historical interest will trace the development of the electric kettle.

Burco, Ltd. (Cb. 315)

Besides a complete range of electric wash boilers there will be on view the new model "E" electrically driven washing machine (illus. page 234) with hand-operated wringer. Of modern cabinet design and finished in white enamel, this machine has a large light-grey vitreous enamelled washing container. The wringer has 16-in. solid rubber rollers, and can be stowed away in the cabinet when not in use. Also shown for the first time will be the new model "211" electrically heated hand-operated machine (illus. p. 240), which is of square design, and combines an electric wash boiler, a hand washing agitator and hand wringer. It is finished in vitreous enamel and has a vitreous enamelled table top.

Cable Makers' Association (Cb. 300 & 401)

This exhibit will demonstrate, as far as possible, the research and testing side of cable manufacture, including insulating media connected therewith. Samples of raw materials in different stages of manufacture will be available for inspection, together with a complete range of the final products. In addition a film showing the manufacture of cable will be exhibited, and there will be a section devoted to some of the earliest known cable installations.

Calorizing Corporation of Great Britain, Ltd. (D. 300 & 401)

See "Babcock and Wilcox, Ltd."

W. Canning & Co., Ltd. (Cb. 118 & 215)

A complete miniature plant 23ft. long for automatic bright nickel and chrome plating will enable visitors to examine the working detail. The synchronising of the transfer mechanism which carries the goods from vat to vat is carried out by electrically interlocked switchgear operated by the main conveyor chain. This gear allows vertical lift and lowering into the process tanks, thus saving a considerable amount of space. The plant includes all the usual processes for cleaning and swilling, and is electrically heated.

Another interesting exhibit will be a model shop for nickel and chrome plating, including the polishing and finishing equipment. In this model the travel of the work is indicated by neon tubing, which displays an ideal layout for economic working. Other electroplating equipment will include low-voltage motor-generators, a metal plate rectifier with control panel, resistance boards of new design with bakelite meters, electrically heated centrifugal drying machines, rotary air pump, and compressor used with filter unit, plating racks covered with the new "Korolac" insulation, and a large assortment of electro-plating materials.

Among polishing machines will be two of the centreless type, with attachments for polishing a large number of circular, tubular and cylindrical shaped articles; a 4-bearing type electric polishing motor complete with dust extractor plant, vertical rod and tube polishing machine with motor-driven feed gear; polishing lathes and materials.

Carron Company (Cb. 721 & D. 701)

Electric fires introduced this season include the "Rodney" (illus. below) and "Hood" with realistic coal effects, and the "Sunstar" and "Carroflector" reflector types. Several fixed fires will be displayed, complete with surround, the "Ben Ledi" being a specially attractive combination. Space will also be found for portable models, dog grates and tubular heaters.

The "Carronade" cooker, adopted largely for hiring purposes, has a remarkably even heat distribution throughout the oven, and the bottom oven tray which provides for this circulation can be removed in emergency to increase oven capacity. Rapid boiling is a feature of the "B.3" breakfast cooker. Electric irons, nickel plated and in colour, will complete the display.

Among other Carron engineering specialities shown on stand D.701 will be stamped forgings and brass, gunmetal and aluminium alloy castings as supplied to customers' special requirements.

H. W. Carter & James, Ltd. (A. 608)

Wire accessories made by the company include grids for cookers and guards for fires, fans, handlamps, etc.

Cellactite & British Uralite, Ltd. (B. 522 & 623)

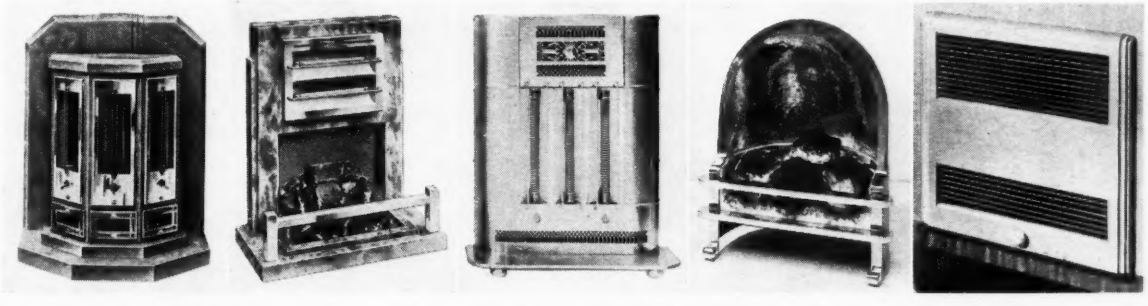
This company will be exhibiting building, gas-flue and ducting products, such as "Cellactite" asbestos-protected metal roofing and ventilators; "Urastone" incorrodible flue pipes and fittings; the new "Kimoloboard," composed of asbestos and diatomaceous earth; "Uralite"; and "Asbestone" asbestos cement.

Cellon, Ltd. (B. 529)

Besides a complete range of "Cerric" and "Cerrux" synthetic finishes for wood, metal and fabric, there will be a special display demonstrating the Cellon patented process of protecting overlapped joints, rivets, &c., by using a specially coated metallic strip.

Chloride Electrical Storage Co., Ltd. (Cb. 307)

A typical "Keepalite" emergency lighting system (illus. p. 233) will be wired up for demonstration, as well as a special emergency lighting system for A.R.P. For this purpose also the new transportable "Sheltalite" equipment will be exhibited. There will also be a comprehensive series of open-type, semi-enclosed and fully enclosed "Chloride" batteries for lighting and power supply and "Exide-Ironclad" batteries for vehicle propulsion, marine work, bus and train lighting, and other industrial applications. Cut-away cells and demonstration boards will show the construction. "Exide," the company's pet electric eel, will be an additional attraction.



Some of the latest electric heaters:—The English Electric "Super Reflector," Carron "Rodney," James Smellie "4571," Bratt Colbran "Sunrise" and Cole inset "Thermovent"

Clarkson Thimble Tube Boiler Co., Ltd. (D. 300 & 401)

See "Babcock and Wilcox, Ltd."

E. K. Cole, Ltd (Cb. 611)

The use of plastic mouldings for the housings of "Thermovent" electric convectors is made possible by their patented "duct-within-a-duct" construction, which keeps the outer surfaces at a temperature no higher than room air. Very high convection efficiency is claimed for this system, the volume of air passed per hour per kW being about 2,600 cu. ft., while the average exit velocity of the air is about 140 ft. per minute. Effective control can be obtained by fixing a thermostat in the incoming air-stream. Types available include portable or floor-standing models, insets (illus. above) and units with luminous effects.

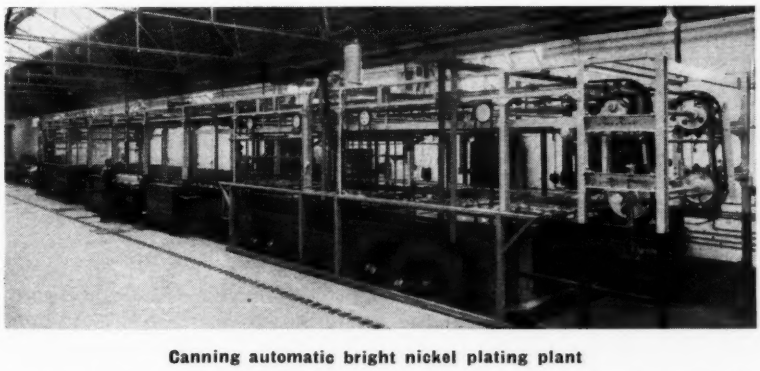
The "Ekco-Coffield" washing machines embody a novel off-set wing agitator which forces the water through the clothes rather than the clothes through the water. Other features are a gravity-tensioned endless belt drive, a sediment zone, double-wall construction, a bowl-bottom, automatic water shutters, push-bar wringer releases and an automatic self-timing switch.

Combi Electric Co., Ltd. (Cb. 117)

Circuit breaker distribution boards and plug-in switches for the protection of small motors, etc., will be special features of the exhibit.

Constructors, Ltd. (Cb. 508 & 609)

"Adjusteel" unit adjustable shelving ensures that maximum stocks can be held in minimum space. Cycle parks, works equipment and office furniture



Canning automatic bright nickel plating plant

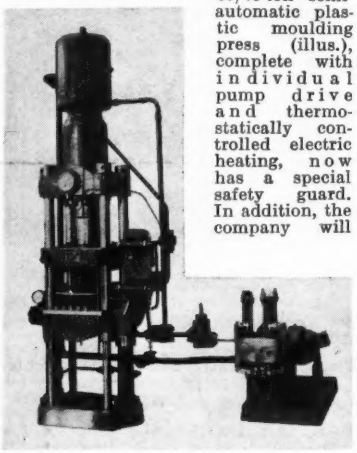
will also be shown, together with portable "Consol" A.R.P. shelters (illus. right) and gas-tight containers of armour plate steel.

Cotto Products (A. 326 & Cb. 705)

Features of the improved "Cotto" electric washing machine (illus. p. 234) are its three independently controlled 850-W "Chromalox" elements; overhead "possing" action obtained by a patent cam and vacuum paddle; a clear tub (the washing action being incorporated in the lid); stainless Monel metal tub construction; a de luxe Lovell wringer, with automatic draining tray; the "Cott-out" automatic safety device; good finish; and low running costs. A special low-priced type will make its first appearance and an electrically heated model with a hand-operated agitator is also available.

T. H. & J. Daniels, Ltd. (Cb 724)

Widely used in the electrical industry for the production of moulded parts, the 50/75-ton semi-automatic plastic moulding press (illus.), complete with individual pump drive and thermostatically controlled electric heating, now has a special safety guard. In addition, the company will



Daniels 50/75-ton semi-automatic moulding press and pump

be exhibiting a preforming or tableting machine for making moulding powders into tablets, and also a large electrically welded air receiver.

Edwin Danks & Co. (Oldbury), Ltd. (D. 300 & 401)

See "Babcock and Wilcox, Ltd."

Delta Metal Co., Ltd. (D. 301)

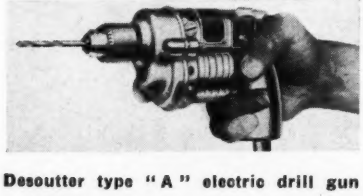
Claiming to be the largest manufacturers of extruded rods and shaped bars in non-ferrous alloys, this company will exhibit an extensive range of semi-finished products for the electrical trade.

Deritend Stamping Co., Ltd. (D. 418)

This display will form part of a joint stand arranged by the Association of Drop Forgers.

Desoutter, Ltd. (Cb. 403)

This company's portable electric and pneumatic tools range from the "Mighty Atom" 3/16in. pneumatic drill up to the "Vidal" 1¼in. electric drill, all models being available in a choice of five to seven different speeds. Lightness is a strong feature and the new type "A" general purpose ¼-in. drill gun (illus.) weighs only 2¾ lb. "Mighty Atom" pneumatic screwdrivers and shears and a



Desoutter type "A" electric drill gun

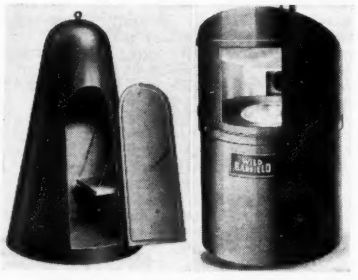
portable pneumatic nibbler are other items of special interest.

R. & J. Dick, Ltd. (D. 213)

A display of belting will include "Dick's Original Balata," "Dixit" and "Ruberix"; also "Dixel" and "Dickrope" Vee-ropes. Various drives will be seen working, and the method of making a spliced joint will be shown.

R. G. Dixon & Co., Ltd. (Cb. 713)

Electric carpet shampoo and floor scrubbing machines will be included



Constructors "Consol" A.R.P. shelter and a Wild-Barfield electrode salt bath for hardening high-speed steel tools

among a display of electric vacuum cleaners, floor polishers, etc.

Dominion Machinery Co., Ltd. (B. 323)

A full plant of up-to-date electrically driven woodworking machinery will include the "Super" and the improved "Model Elliot" combination woodworkers (illus.), a combined chain and chisel mortiser, various types of saw benches, surfaces and thicknessers, dovetailing machines, sanding machines, band saws and crosscutting machines. Three new machines to be shown for the first time are a 24-in. band saw, a chisel mortiser, and a combined fret saw and moulder. In the last-mentioned item the drive is so arranged that there are no twisted belts, and changing over from the fret saw to the spindle moulder is a matter of seconds only. All the machines mentioned have self-contained electric motors.

Donovan Electrical Co., Ltd. (Cb. 309)

Compactness, improved performance and ease of wiring are features of two new products, the type "708" direct-switching automatic contactor starter (illus.) in dustproof case, 0/2 HP, and a compact 100-A "Scrutact" fuseboard employing 25,000-kVA h.r.c. cartridge fuses. The starter measures overall only 5⅞ in. by 4⅝ in. by 5⅞ in., and owing to a positive latch on the overload it is proof against reasonable vibration. The circuit is opened by gravity and three hand-reset overloads of the inverse-time solder-film type are used.

"Scrutact" fuses to be shown up to 800 A all employ rigid base contacts that cannot distort if overheated, with bridges

The compact Donovan "708" direct switching automatic contactor starter

that give wedge-operated positive pressure on the contacts. The cartridges can be replaced instantaneously without tools. A further development of a combined isolating switch and push-button starter, with transformer for local lighting, is applicable to low-voltage lighting. New accessories for control gear are multi-button pendant push-buttons and limit switches. The "Runtact" overhead power duct supplies portable tools without the danger or nuisance of long lengths of trailing flexibles. "Safuse" rewireable fuseboards, change-over switches, motor control gear, push-buttons, float switches, industrial type plugs and sockets, and flexible conduit couplings, will also be represented.

Dorcam, Ltd. (Cb. 710)

This company specialises in bakelite mouldings for the electrical trade.

Drew Clark & Co. (A. 226)

Scaffolding costs are claimed to be halved by using the "Rap-Rig" scaffold, which, together with "Diamond" ladders and steps, tower ladders, &c., form this display.

Earle, Bourne & Co., Ltd (D. 500)

This company manufactures brass sheets for electric fires; special brass for condenser vanes for the radio industry; solid drawn brass and copper tubes for condensers, refrigerators, &c.; copper tubes in ornamental shapes; drawn sections; mouldings; electrical conduit, &c.

Thomas Eaves, Ltd. (Cb. 302)

This company undertakes brass and iron repetition work for the electrical and allied industries.

Electromagnets, Ltd. (Cb. 212)

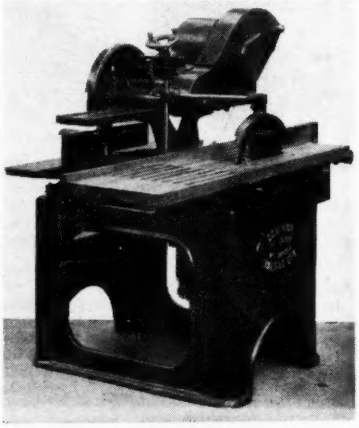
Electro-magnetic and permanent-magnetic separators are made for all purposes.

E. Elliott, Ltd. (Cb. 413)

In addition to mouldings in bakelite, urea, &c., the company has developed injection moulding of cellulose acetate, "Trolitul," "Diakon," &c., for which a special plant has been installed; visitors will also see samples of turned articles in "Erinoid," "Galalith," &c.

English Electric Co., Ltd. (Cb. 512 & 613)

Ovens of E.E. cookers are specially designed for "Ritemp" automatic oven control (illus. p. 236) and a novelty will be a cooker fitted with sound equipment which automatically describes the advantages of the system. Standard cookers are now available including two-tone ivory and green and cream. Some of the cookers shown will be fitted with



The improved "Model Elliot" combination woodworker (Dominion)

new high-speed boiling plates. A "HC.210" cooker suitable for small households will be accompanied by examples of breakfast cookers available with solid or radiant grill-hotplates.

Among fires will be the new 3-kW "Super" reflector fire (illus. p. 229), an illuminated panel fire, an adjustable screen fire and a convector heater with an illuminated panel in the base. Representative of water heaters available in capacities up to 20 gal., 1½ and 5-gal. sizes will be seen on circuit. The "My-Domestic" washing machine and the "Phœnix Handry" will also be shown.

Fuse gear for industrial and sub-station distribution incorporating E.E. high-rupturing capacity, non-deteriorating cartridge fuses includes a "Combination" fuse-switch board for factory distribution embodying 30, 60, 150 and 300-A fuse-switch units and metering panel, together with the recently developed 500 and 800-A fuse-switches. A 3-phase, 3-wire arrangement of the company's distribution system for factories using individually driven machine tools will be seen comprising an overhead bus-bar chamber with tapping-off sockets which accommodate plug-in fuse units for feeding machine tools below. The new "SS" 250-V; the "LP" 500-V switch and fuse units, and the "U.35" distribution units for feeder pillar and sub-station use; "Skeltag" link and fuse units, and pole-mounting, ground-operated fuse units will also be represented.

Of particular interest among switchgear will be the new high-breaking-capacity air-break switchgear (illus. p. 233), shown mounted in a sheet-steel cubicle with bus-bars, &c., and fully interlocked isolation. A range of transformers has been developed to meet the increased demands for units for low-voltage lighting in mines, &c. Specimens of motors will include fractional horse-power units; a 40-HP DC motor for operating a four-high strip mill; a small flameproof machine; split-phase, three-phase and capacitor types, from ⅛ to 1 HP, together with

geared motor units; and a ⅛-HP capacitor motor incorporating a built-in thermostatic control unit. House service meters will be displayed in both quarterly and prepayment types.

E.R. Co. (Cb. 206)

"Erco" appliances include cylinder-type vacuum cleaners; bowl and reflector fires; infra-red-ray lamps; fans, and fractional horse-power motors. Both the reflector fires and the fans are offered in a choice of five colours.

Erith's Engineering Co., Ltd. (D. 300 & 401)

See "Babcock & Wilcox, Ltd."

Ether, Ltd. (Cb. 716)

This company's pyrometers, which are mostly of the thermo-electric type, cover temperature ranges from zero to 1,600 deg. C. The "Indicorder" continuous chart-recording and controlling pyrometer (illus. p. 239) for the automatic temperature control of furnaces not only records and indicates the temperature, but switches "off" and "on" any form of heating apparatus and controls temperatures to within ± 2 deg.

Electrically operated, gas, oil and steam valves are available for operation in conjunction with thermostats and other forms of control, and also for use as remote-controlled safety devices. A portable milli-voltmeter is suitable as a master measuring instrument for checking production instruments. Low-tem perature measuring instruments of the bi-metallic, vapour pressure and mercury-in-steel types are further products.

Evenlite Tube Lamp Developments, Ltd. (Cb. 110)

This company specialises in tubular lamps of all kinds.

FitzGibbon & Murray, Ltd. (Cb. 111)

A push-bar lampholder with a new action is of particular interest. Floor standards made partly of unscratchable "Erinoid" have a permanent high gloss, while attractive pastel colourings are secured by a further use of "Erinoid" in a range of three-light pendants. Imitation wax candle tubes for period fittings are available in any colour.

W. T. French & Son, Ltd. (A. 433)

"Mysto" products include aluminium ware, electric wash boilers, fires and other domestic appliances.

Fry's (London), Ltd. (B. 219)

Several new "Enox" tools will be exhibited. The improved tube cutter No. 2 has a capacity up to 1¼in. copper pipe, and a new series of rubber mallets should be of interest to sheet workers. Jardine wrenches (Canadian), for which the company is the sole British agent, are available in the standard Stillson type or with special strengthening. "Myford" lathes, for which Fry's are wholesale distributors, will also be introduced.

A new low-priced electric power grinder (illus. p. 223) is fully warranted to stand up to the severest strains of a standard engineering workshop. Other tools to be exhibited are hack-saw frames and blades, "Enox" and "Brasso" brands, B.A. spanners, drill stands and the "Wo-Tan" reamers (both solid and adjustable), power grinders with fast and loose pulleys, a friction feed bench drill, saw benches and a 2½-in. lathe.

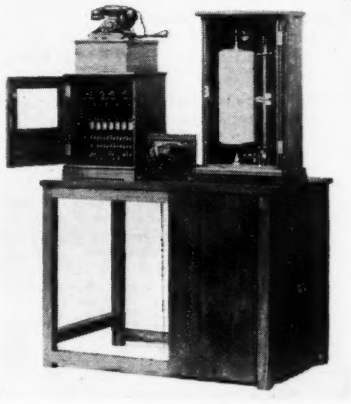
"Fusarc" Welding Co., Ltd. (Cb. 717)

Exhibits of special interest will be an automatic arc welding head (illus.) mounted on special frame, together with a generator group (maximum output of 600 A) and a new type of continuous electrode; and manual arc welding machines comprising an AC/DC portable welding generator (225 A); portable AC transformers (200, 160 and 110 A); and electrodes. Both automatic and manual arc welding will be demonstrated.

General Electric Co., Ltd. (Cb. 414 & 515)

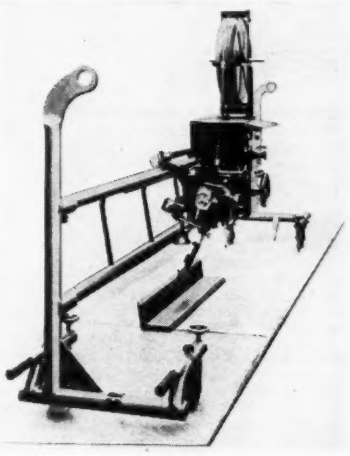
A selection of products will range from large power plant to small instruments will be shown. Heavy engineering will be represented by a steel-clad mercury arc rectifier of the pumpless air-cooled type and a metal-clad switchgear unit of the "Subgear" type (illus. below). The latter is a 11-kV unit of the single bus-bar type rated at 1,000 A with a breaking capacity of 250MVA, outstanding features being its simplicity and the accessibility of the components. The range includes units with breaking capacities from 75 to 350 MVA. An ironclad switchboard is used for controlling the supply to the exhibits. A mains torch will be included in a range of certified apparatus for dangerous situations.

Four street-lighting lanterns, the "Difractor," "Horizal," "Wing" and "Unidirectional" types, will be accompanied by wax-filled chokes and transformers for use with "Osira" lamps, and also a model of the G.E.C. centralised control



Gent liquid level indication transmitting apparatus

system. A new 4-kW mobile aerodrome landing floodlight (illus.) will be shown complete with petrol engine, alternator, exciter and switchgear, all mounted on a trailer. A 2-kW set illuminator for film studios incorporates a 10-in. "black" prismatic glass lens. Industrial lighting fittings will include units for use with both mercury (including "Osira" fluorescent) and tungsten lamps or combinations of these. Fluorescent lighting will be used in a novel way



Automatic arc-welding machine (Fusarc)

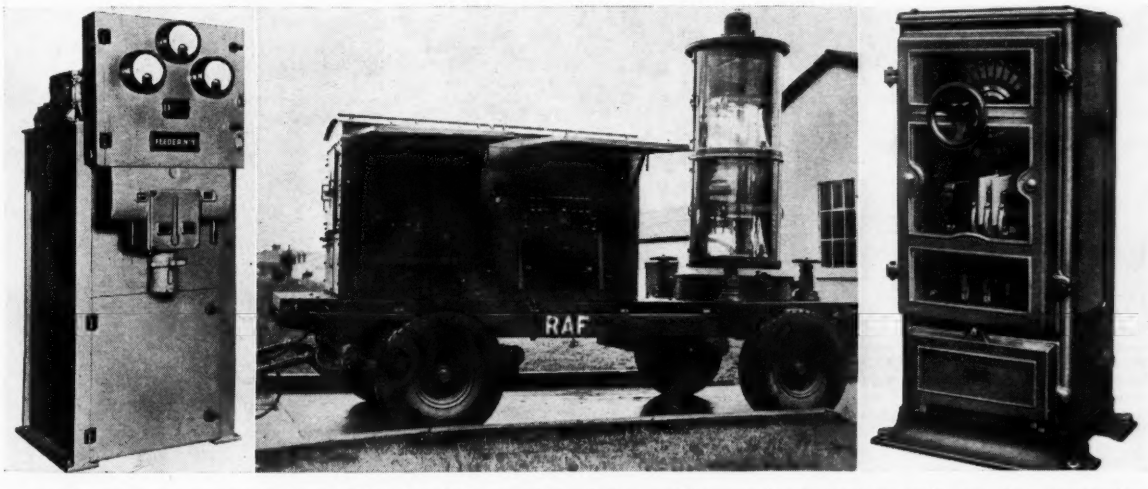
to draw attention to different types of "Osram" lamps.

The principal feature of the domestic cooking display will be provided by examples of the new "DC.100" cooker (illus. p. 236) in different finishes. Automatic oven control and simmering devices are fitted as standard on some of the models. Among "Coldair" refrigerators is the new "DMD.31" model which, although having an actual capacity of 3.23 cu. ft., occupies no more floor space than the average 2- or 2½-cu. ft. model. A commercial type compressor unit will coat with frost the name "Coldair" illuminated in various colours.

Gent & Co., Ltd. (Cb. 513)

A new item, of especial interest, is apparatus (illus.) for transmitting details of the level of any liquid over the G.P.O. telephone system. The distance over which it will operate is almost unlimited and the cost of obtaining this information service is only that of an ordinary telephone call, there being no line rental charges.

A turret clock dial movement operated by a waiting train movement; a motor-driven striking mechanism; alternative dials for "Pul-syn-etic" impulse clocks; independent synchronous-type clocks; fire-alarm equipment, luminous call systems for hospitals, hotels, offices and ships; sound signals, including a new type of solenoid-acting bell with an exceptionally loud ring; relays, including models for bringing lamps into circuit when the telephone bell rings; mine-signalling apparatus, including a new automatic certified mining magneto telephone coupling unit; syrens from 1/10th to 8 HP (the 4 HP type being specified by the Home Office for A.R.P. warnings); and intercommunication telephones will also find places on the stand, which will



G.E.C. 11-kV "Subgear" unit (250-MVA breaking capacity), G.E.C. mobile aerodrome landing unit and the Morecambe pillar type control panel

be surmounted by a 4-ft. neon synchronous clock.

Apart from the stand exhibit there will be some sixty electric clocks installed throughout the exhibition buildings and controlled by a master clock on the stand. A turret clock consisting of four 4ft. 6in. dials, operated by a synchronous movement, will also be found on a steel scaffolding tower outside the front entrance to the Fair.

F. Gilman (B.S.T.), Ltd. (Cb. 518)

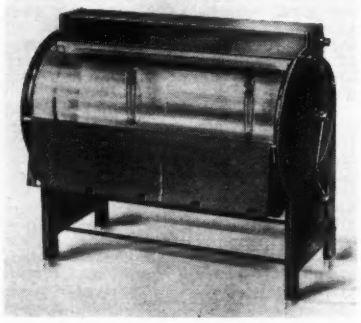
Flexible-drive machines will include "Skatoskalo" units for boiler, economiser, evaporator and condenser scaling work; and also "Multiflex" machines for grinding, sanding, polishing, drilling, wire brushing, etc. A special display will be made of rotary milling cutters, which are now produced in the company's own works, and are used widely not only in the aircraft industry, but also by industrial concerns for removing metal from dies and other material.

Girdlestone & Co. (D. 323)

Electric "motor pumps" having capacities of 500 gallons to 15 tons of water per hour will be represented. These are sturdy, compact electric pumps built as one unit on a single shaft and enabling large outputs to be obtained in relation to size, weight and cost. Due to the radial and thrust bearings being arranged in the motor frame and therefore external to the pump, water containing grit and abrasives can be dealt with. The pumps are also frequently made in special alloys for pumping corrosive liquids. For chemical work an electric diaphragm pump (illus.) is available in various alloys, also ebonite lined.

Gittings & Hills, Ltd. (B. 324)

Considerable developments have been made in industrial finishes. The latest "Rockhard" finishes, distinct types of which are available for each particular purpose, require only ten minutes' stoving at 250 deg. F. and withstand high temperatures for long periods. Water resistant types have been developed as well as finishes of special toughness and



A Hall "Sirius" electric copier

flexibility for articles which habitually meet with rough usage. All types are available in a wide range of colours.

Other products are "Lustreloid" cellulose enamels; "Metalard" oil-proof tool and machinery enamels, including an air-drying type which dries in half an hour; "Amsuline" anti-corrosive coating; and "Fouramel" liquid wall glaze, specially suitable for power houses, offices, showrooms, &c.

Gledhill Brook Time Recorders, Ltd. (Cb. 719)

This company's time recorders register attendance time, process costs and machine time, and special models are available for quarries, mines and for other outdoor uses. Most units can be fitted with synchronous motor drives.

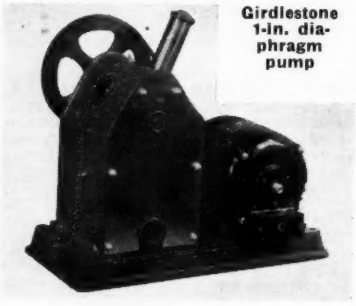
James Gordon & Co., Ltd. (Cb. 716)

The new type "E" motor-operated "Mono" combustion recorders will be seen in both simplex and duplex types. The "Igema" distance boiler water level indicator will be a further item of interest, and there will be representative regulators used in connection with the Hagan system of automatic boiler control.

Greenwood & Batley, Ltd. (D. 212 & 313)

This exhibit will be devoted to "Greenbat" electric mining locomotives and industrial trucks. The presentation of the mining locos in a full scale model of a mine gallery will be both novel and arresting, and the locomotives shown will include 24-in. gauge battery driven tramming or gathering loco and an 8-ton 36-in. gauge trolley type main haulage mining locomotive.

The truck exhibit will comprise an electric bar type tiering truck for handling coils of wire, &c., a flat platform 2-ton electric truck fitted with a 15-cwt. capacity "W.H.B." type electric crane,



Girdlestone 1-in. diaphragm pump

a 2-ton electric elevating platform truck. and a 10-cwt. flat platform electric truck.

Grosvenor Utilities, Ltd. (Ca. 707)

Re-enamelling electric cooker parts is a speciality of this company.

Guest, Keen & Nettlefolds, Ltd. (B. 524)

Representative products will comprise high-tensile bolts, rivets, washers, nuts, self-tapping screws, rods, bars, hot- and cold-rolled strip, and foundry castings.

G.W.B. Electric Furnaces, Ltd. (Cb. 204 & 303)

See "Wild-Barfield Electric Furnace, Ltd."

Hague & McKenzie, Ltd. (Cb. 400)

Thick-bottomed "Pyramid" aluminium utensils specially constructed for hotplate cooking now comprise 180 different shapes and sizes, including exceptionally strong types in large diameters for hotels, ships, hospitals, &c. A new two-heat electric iron (illus.) will be shown for the first time, together with two-heat electric porringers, steam cookers and coffee urns, "Swift" electric kettles in various sizes and finishes and incorporating a new automatic cut-out, warming plates, coffee percolators, "Wagtail" kettles, toasters, and the "Heatlite," a combined garage lamp and car heater.

B. J. Hall & Co., Ltd. (D. 727)

Medium-pressure mercury vapour electric discharge lamps have been adopted as the source of illumination for the "Sirius" (illus.) and "Verax" electric copiers. The latter are double-sided and continuous, giving uniform printing on both sides. The well-known "Hall-Mark" copier, which utilises a Hall-Thorkelin horizontal arc lamp, has been redesigned to meet modern requirements.

Harland Engineering Co., Ltd (Cb. 503)

Electric motors, centrifugal pumps and other specialised products are produced by this company. The motors to be shown are 60-BHP and 23-BHP squirrel-cage units and a 10-BHP DC motor, while amongst the pumps will be a "Spiroglide" single-stage, split-casing type with its top cover removed to disclose the rotor. Combined units will include a four-stage pump for 800-GPM, 460 ft. head at 1,500 RPM, coupled to a 150-BHP slip-ring motor and mounted on a fabricated steel bedplate. The motor contains features of unusual interest. The precision of Harland toolroom products will be demonstrated by a punch and die for the stator segments of a very large synchronous motor, and a typical jib for small parts.

G. A. Harvey & Co. (London), Ltd. (B. 327)

Apart from such steel equipment for works and offices as filing cabinets, cupboards, shelving, storage bins, &c., the company produces riveted and electrically welded work of all descriptions; "Harco" perforated metals; ornamental metalwork; woven wire cloth; machinery guards, &c.

O. C. Hawkes, Ltd. (B. 407)

Decorative iron lighting fittings usually absorb a considerable amount of light. This company, however, which specialises in artistic products, has evolved the "Hawklight" reflector which is claimed to enable a 60-W lamp to give an intensity equal to a 100-W lamp in an ordinary fitting. The three-light ceiling fitting (illus. p. 226) incorporates decorative wrought ironwork and has an amber flashed opal bowl which can be sprayed in colours as required. Fittings are available for public buildings, institutions and cinemas, as well as domestic buildings.

F. C. Heayberd & Co. (Cb. 618)

To meet the rapidly growing demands for rectifying equipment for electric

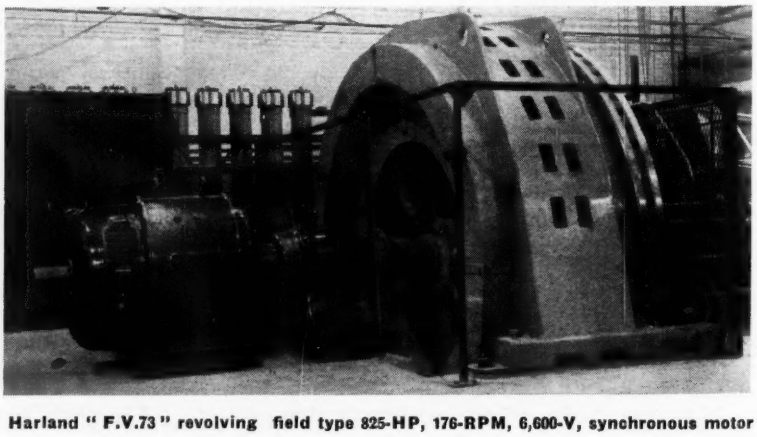
"Pyramid" two-heat iron (Hague & McKenzie)

vehicles the company now markets eighteen different types, employing automatic control and capable of charging up to 40 A. In addition, there are five models of the non-automatic type for small hand-trucks and various smaller models for charging car and radio batteries (illus. p. 233).

Emergency lighting apparatus will also be represented, together with transformers for low-voltage lighting and conversion purposes. These low-voltage transformers are made in three types with outputs of 12, 25 and 50 V and a current rating of up to 700 W. Other types of transformers and rectifying equipment will be seen for change-over schemes, plating plants, lifts, signs, low-voltage hand-lamps, laboratory work, &c.

Alfred Herbert, Ltd. (D. 304 & 309)

An "Atritor" unit coal pulveriser



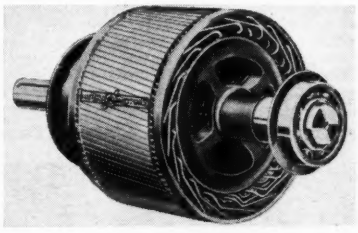
Harland "F.V.73" revolving field type 825-HP, 176-RPM, 6,600-V, synchronous motor

(illus.) to be shown firing a furnace and lead pot has a capacity of 500 lb. of coal per hour. The pulverised coal is delivered into a small cyclone service bunker holding about one ton—equal to four hours' requirements under normal conditions. At the base of this bunker there is a motor-driven feeder. This delivers the pulverised coal at the desired rate into a fan which, in turn, conveys it to the main. This distributing system, the "Atritor Ring Main System," can be applied to the firing of a considerable number of furnaces, each with independent control by means of valves in the main.

A separate exhibit of small tools will include "Coventry" dieheads, air chucks and vices, "Ardoloy"-tipped lathe tools, milling cutters, twist drills, reamers, friction clutches, gearing and Wickman type adjustable caliper gauges.

Higgs Motors, Ltd. (Cb. 619)

A selection of electric motors will cover types and sizes from $\frac{1}{8}$ to 100 HP. In addition, there will be components used in building the motors and also geared units. Complete gear boxes in operation will show the low speeds to which the standard motor speeds can be reduced. A new low-starting-current squirrel-cage machine (illus.) will be shown for the first time, together with two examples



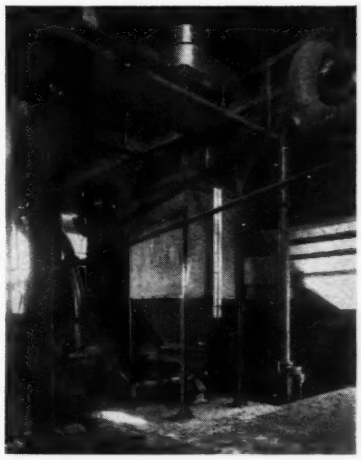
Rotor of a new Higgs low-starting-current squirrel-cage motor

of a new type of variable-speed three-phase commutator motor.

Holden & Hunt (Cb. 602 & 703)

A wide range of electric low-voltage resistance welding machines of the spot, continuous stitch spot, butt and flash butt types and rivet heaters will be seen in operation. A new development is a single head 12-kW electric rivet heating machine (illus.), as used in boiler plating and construction engineering work.

In the spot welding machines, which are available in ratings of 5, 10, 15, 25, 40 and 50 kVA, particular attention has been given to obtain very little foot pedal travel: toggle pressure gear, however, gives extremely heavy pressure on the weld. As the welding is done instantaneously no timing gear is required. The machines operate from the thinnest up to $\frac{1}{2}$ in. added thickness in mild steel. An automatic trip switch is fitted, together with a four- or six-way heating speed box. Outstanding features of these machines are their simplicity of operation, adaptability, and saving in cast and time. They are controlled entirely by foot, so that the operators' hands are left free. Several improvements are embodied in a 15-kVA spot welder with a weld time valveless control gear, and in a 25-kVA continuous stitch spot welder.



Typical "Atritor" installation for firing forge furnaces on the ring main system (Alfred Herbert)

"Scaducu" spot welding electrode copper for welding tips is claimed to have a life of eight to ten times that of hard electrolytic copper.

The company's butt welders cover a welding capacity from $\frac{1}{32}$ in. diameter to $1\frac{1}{2}$ in. square, and four models are completely automatic. One portable type weighing only 60 lb. is made almost completely of aluminium; its rating is $1\frac{1}{2}$ kVA. and it can safely be plugged into a wall socket. The machines are semi-automatic in control by means of a foot switch operating a contactor. Six heating speeds cover the full range of the machine. Interested visitors will be invited to test the simplicity of the process themselves.

The company also makes chain-making machines, starter gear rings, brake drum rings, speedometer gear rings, motor car components, etc. A welding section fabricates such wire goods as oven and refrigerator shelves and lampshade frames.

Horstmann Gear Co., Ltd. (Cb. 610)

The "H.B.E." cooker time switch, introduced experimentally in 1938, is now in full production. Not only does it enable the required cooking time to be pre-set, but, in addition, the commencement of the cooking period can be delayed up to a period of fourteen hours from the time of setting. Two models are available, one for wall-mounting and the other for incorporation in the switch chamber of new cookers. The device can, of course, be applied to other domestic and industrial appliances. Two operating displays will show the self-starting pro-perties of the "H.B.E." 200 RPM synchronous motor.

Among other types of time switch, the "K" 10-A synchronous-driven model (illus., p. 234), with solar compensating dial, measures only $4\frac{1}{4}$ in. by $2\frac{3}{4}$ in. by $2\frac{5}{8}$ in., and incorporates a circuit tester. It can be used in the base of columns without an extra cast metal box. The operation of the "H.B.E." solar dial used will be explained. The "W" window lighting switch gives both manual and automatic control, and also, by placing the two automatic tappets together, the switch will give automatic switching "off" only, manual control being used for switching "on."

Hotpoint Electric Appliance Co., Ltd. (Cb. 507)

An illuminated centre display will show electric water-heating equipment, particular attention being drawn to immersion heaters and circulators developed for special applications. A constant hot-water unit to be seen working has a 4-kW loading and gives a constant output of about 3 pts. of water per minute at 130 deg. F.

A new electric cabinet washing machine (illus. p. 234), which is only 22 in. square and 34 in. high, can be installed under the draining board, the wringer being stowed away in the base. The company's well-known rotary ironer will be demonstrated as well as a new table ironer (illus.) with dual thermostatic heat controls, an ironing surface of over 266 sq. in., an automatic pressure of 300 lb., and so designed that it can be used on the smallest of tables.

Cookers will include models fitted with thermostatic oven control and also one with automatic time control. "Torribar" radiant boiling plates and grill

Hotpoint table ironer

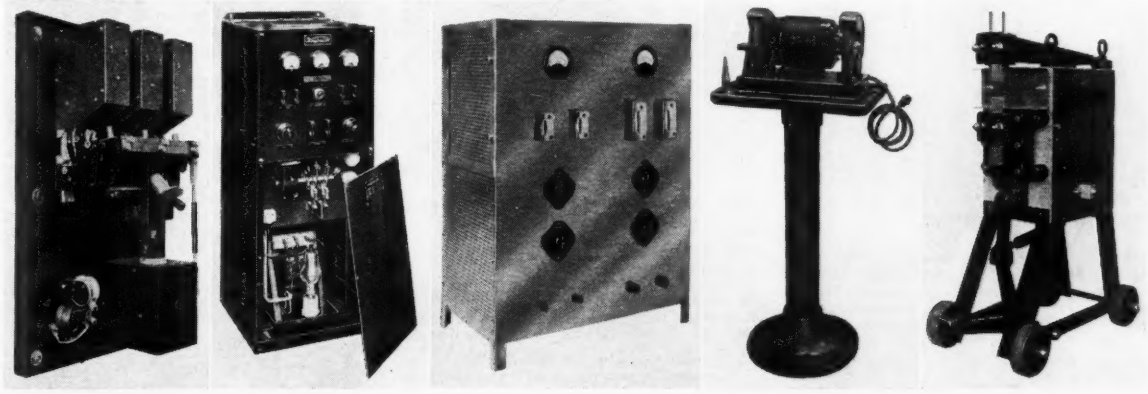
boilers for fitting to other makes of cookers will also be represented, together with a comprehensive display of electric kettles, breakfast cookers, cleaners, toasters, warming and boiling plates. A new automatic iron, the "Plus Five," incorporates an ingenious swivelling flex device.

Hurley Machine Co. (England) (Cb. 709)

The latest "Thor" washers and ironers will be demonstrated.

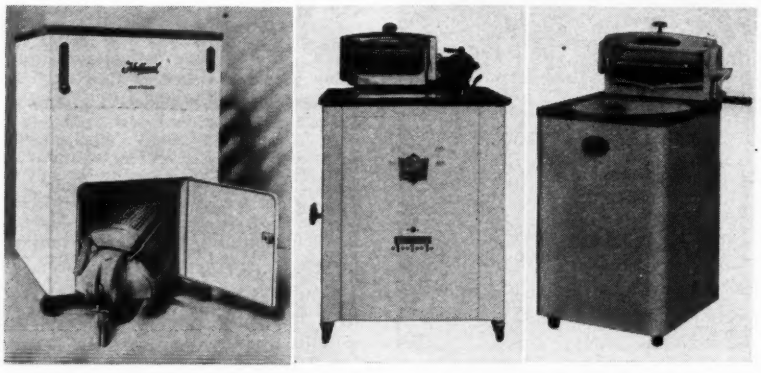
I.C.I., Ltd. (Degreasing) (D. 305)

Special interest will be taken in a demonstration of a totally enclosed rumbling plant ingeniously designed to minimise the solvent consumption. Two degreasing plants will also be shown.



English Electric "OB.3" 1,600-A triple pole air-break switch, Chloride "Keepalite" charging and control cubicle, Heayberd twin-circuit battery charger for HT and LT transmitter batteries, Fry's (London) small electric grinder, and Holden & Hunt electric rivet-heating machine

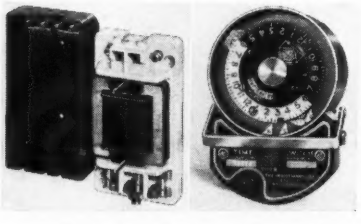
I.C.I., Ltd. (Heat Treatment) (D. 204)
Electric furnaces will demonstrate various salt bath heat treatment processes, including the "Rapideep" process.



Three cabinet type washers:—The Hotpoint, Cotto and Burco "E"

I.C.I., Metals, Ltd. (D. 302 & 403)
The "Broduit" system of conduits will be demonstrated and high conductivity strip for electrical work will also be shown, together with brass and other alloys of copper in the form of plates, sheet, strip, wire, rod and sections; strip and sheet in copper and its alloys in various sizes and gauges; and a selection of rods and extruded sections. "Everdur," an extra strong copper alloy, is being used increasingly for boilers, cylinders, storage tanks and heaters, etc., and special attention will be drawn to the ease with which it can be welded. "Kynal" aluminium alloy will be shown in sheet, strip, rod and tube.

Victor H. Iddon, Ltd. (Cb. 127)
In addition to the general range of "Nettle" quick-wiring accessories, there



A small Iddon step-down transformer and the Horstmann "K" time switch

will be several new lines. The company's popular ceiling fitting is being moulded in several new colours, while the type "22" standard block ceiling rose is now made with cord-grip for c.t.s. flexible, or with single or three hooks for fittings. The principal feature of this line is that the back plate and interior are standard, and are easily interchangeable with any of this range. The type "12" ceiling rose is also made to grip c.t.s. flexible.

Small step-down transformers (illustrated) are an entirely new product. As yet they are made only in the smaller sizes, such as the 1-A type and the 5 and 10-A types to conform with B.S. Specifications. A special feature is the automatic mains cut-out on the lid, supplied fused or otherwise.

International Combustion, Ltd. (D. 222 & 321)
A "Ty-rock" mechanical screen, well known in the colliery and quarry trades, will be shown in operation, together with a "Vacseal" pump and a Hardinge constant weight feeder. A newcomer will be the "Syntron" vibrator (illus.), a simple pulsating electro-magnet which can be applied to bins and hoppers to prevent material arching over and clogging; to chutes for speeding up flow of material; or to moulds and forms to facilitate packing, etc. There will also be a bank of "Lopulco" finned tubes for furnace lining and models of a combustion steam generator, a La Mont boiler, and a Beaumont drag scraper plant.

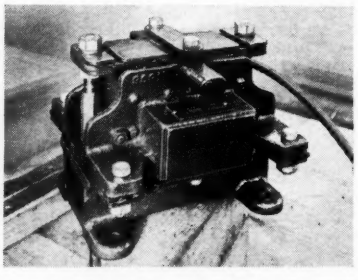
Jackson Electric Stove Co., Ltd. (Cb. 409)
Over a quarter of a million of the "90" series electric cookers, examples of which form the centrepiece of this display, have now been sold. Attention is drawn to the "Backer-Jackson" radiant boiling plate, which can be fitted to all Jackson cookers. This is a combination of the solid and tubular plates. It operates at a visible red heat, but can be wiped clean with a damp cloth. Neither special utensils nor deflector plates are needed. Various sizes of "100" series cookers will also be seen, and an opportunity will be given to inspect the many colour finishes available. Models fitted with thermostatic oven control will be included.

In the washboiler section will be a sink model having a pressed aluminium top with a lip which overlaps the kitchen sink. A hinged white vitreous enamelled draining board covers the apparatus when not in use, and the tubular legs are adjustable to any height of sink. To illustrate the automatic action of the safety device incorporated, an empty washboiler will be arranged in circuit with a pilot lamp.

Fires will be shown in various vitreous enamel finishes, together with a range of water heaters. Among cooking apparatus for hotels, restaurants, hospitals, etc., will be a single-deck pastry oven with thermostatic control and also a Backer-Jackson radiant boiler plate (4-heat) arranged for quick counter service.

Johnson, Matthey & Co., Ltd. (Cb. 308)
New products are a low-temperature brazing and silver soldering outfit, silver solder alloy, a silver-on-steel chemical plant, and platinum micro-chemical apparatus.

Richard Johnson & Nephew, Ltd. (B. 514)
Wires of interest to electrical trades will comprise conductors in copper, cadmium copper, steel-cored aluminium,



Type "V.55 Syntron" vibrator (International Combustion, Ltd.)

etc. There will also be a wide range of industrial wires.

N. C. Joseph, Ltd. (Cb. 514)
Among aluminium cooking utensils will be electric kettles of modern design.

H. Kaufmann, Ltd. (A. 502 & 603)
Vacuum cleaners and irons will be shown.

Lacrinoid Products, Ltd. (A. 628)
Besides the well-known "333" and "555" two-way light and heat adaptors, there will be the new "900X" torpedo switch, available in pearl colour effects and suitable for table and standard lamps, etc.

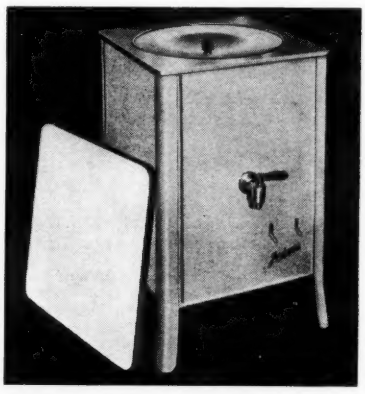
Lan-Bar, Ltd. (A. 425)
Several new products will be found among a display of electric towel rails, and electrically heated drying and airing cabinets.

Ley's Malleable Castings Co., Ltd. (D. 402 & 503)
This company specialises in castings in "Black Heart" malleable iron, which is claimed to have a tensile strength of 24 tons per sq. in. consistently, in contrast with that of the B.S. Specification of 20 tons per sq. in. Similarly, its elongation is 18 per cent. instead of 7½ per cent. and its cold bend test is 180 deg. instead of 90 deg. Exceptionally free cutting properties permit high machining speeds with reduced wear and tear on tools. Two new highly specialised metals will be on view, and in addition there will be a selection of Ewart's chains for power transmission, elevators and conveyors.

R. A. Lister & Co., Ltd. (D. 202)
Three of the latest auto-trucks, as used regularly at the Fair for the installation of exhibits, will form this display.

London Aluminium Co., Ltd. (A. 310 & 411)
A film will show how a "Diamond" kettle is produced. Prominent among new lines will be hotplate utensils with attractive, hand-engraved designs. "Diamond" electrical exhibits will include the extra rapid boiling "550" kettle with a 1,800-W immersion element embodying a patented float control cut-out; the "560" heater-cooker, useful where space saving is important; and coffee percolators.

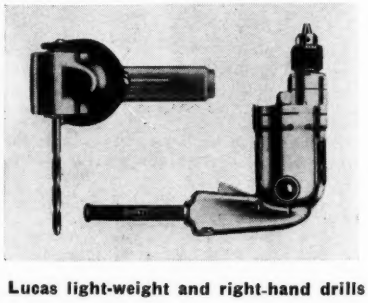
Lorant & Co., Ltd. (Cb. 714)
The new "Rindis Junior" bench filing machines have a 7 in. diameter filing



Jackson square wash-boiler

disc, with semi-circular milled teeth; it can be used on any type of material, as long as it is not hardened, and its speed is adjustable. The "Lorantco" cup wheel grinder, with a 7 in. diameter by 2 in. thick by 1¼ in. face cup wheel, is driven by a ½-HP, 1,425-RPM motor, the grinding wheel running at 3,000 RPM. Another 10-in cup wheel with a 2-in. face runs at 2,000 RPM, while a 7-in. filing machine is arranged for three-speed operation. Flexible shaft outfits will also be represented.

Joseph Lucas, Ltd. (Cb. 501)
Special demonstrations and working exhibits will draw attention to the latest car, motor cycle and cycle equipment, and there will be a comprehensive display of "Rotax" electrical equipment for aircraft, including a new type of magneto, magnetos with double contact breakers, starters, lighting generators, and batteries. C.A.V.-Bosch commercial



Lucas light-weight and right-hand drills

vehicle electrical equipment will also be represented. Portable electrical tools (illus.), to be seen both working and in section, will include drills from 3-16-in. to 1¼-in., screwdrivers, sanders, polishers, valve refacers and double-ended bench grinders with adjustable eye shields. In addition to the universal type units, high-frequency tools will be demonstrated. Efficiency, minimum current consumption, sturdy construction and safety in control and handling are special features claimed.

MacGregor & McCallum, Ltd. (Cb. 112)

To the range of gyrator-type washing machines has been added the new streamlined "Ace No. 10" model. The similar "Mayfair" model incorporates a *de luxe* wringer with special safety release action. Another new washer is the "Mayfair Spindry" (illus. p. 240) with a high-speed hydro-extractor in place of the usual wringer.

New "Magic" vacuum-cup washers are the "G.S.P." and the "A.1 Spindry" models, both of which are finished in white and have electrically driven pumps and motor switches. On the "G.S.P." unit is fitted a *de luxe* wringer with the latest safety release, while the "A.1" has a rotary spinner. Both gyrator and vacuum-cup actions will be shown by machines with transparent tubs.

Ironing machines are available both for fitting to the wringer posts of the washers and also as independent pedestal units.

Robert Maclaren & Co., Ltd. (Cb. 115)

Patent short gap non-magnetic snap-action switch mechanism is an exclusive feature of the Maclaren thermostats, which can be applied to domestic, industrial and scientific temperature-control systems covering temperatures from zero to 1,000 deg. C., for electricity, gas, oil, water or steam. The "Thermo-Time" regulator, for the automatic control of heating installations, operates in accordance with the outside temperature, daily, or as required.

Donald Macpherson & Co., Ltd. (B. 527)

The makers of "Foochow" paints, enamels, varnishes, etc., will draw special attention to a one-coat glossy synthetic material, which can be applied by the "wet-on-wet" process, and by dipping, spraying or brushing. This material will both air-dry and withstand heat treatment.

Mansions Motor Co., Ltd. (D. 710)

Of particular interest among a range of "Kango" electric hammers will be model "C" (illus.) especially suitable for chasing for electric conduits, besides drilling holes up to 1 in. diam., bush hammering, boiler scaling, etc. With double the blow, the model "D" is used for drilling (especially for large holes in hard materials), cutting away concrete, tamping, chipping steel and cast-iron, and driving in copper rods for earthing, etc. A spade hammer is designed for cutting clays, etc.

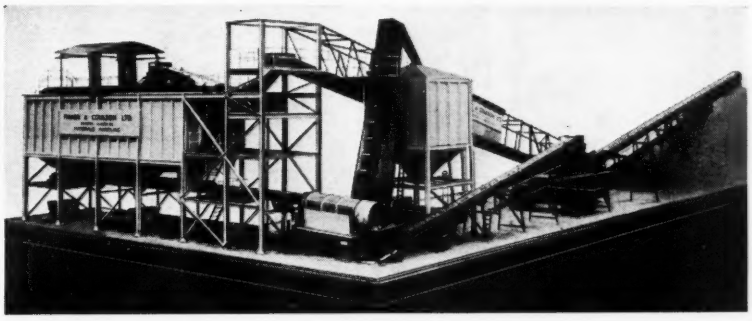
Advantages claimed for the "Kango" hammer are: No blows are struck until the hammer is pushed on to the work, so that no damage occurs through idle blows; power is constant and does not diminish as the hammer gets older; the result of the blow is prevented from reaching the armature winding; and cheapness and ease of maintenance.

Kango hammer being used for chasing for electric conduit (Mansions Motor Co.)

Mavor & Coulson, Ltd. (D. 620)

Sectional belt conveyors and their applications will be demonstrated by a large-scale model (illus.), which has a frontage of 25 ft. In these conveyors unit lengths of inverted troughing are joined together to form a light, rigid support for the idler rollers. The troughs may be laid direct on the ground, or may be built into a structure by means of trestles, the troughs themselves forming the top member, or they may be placed in a bridge or gantry, in which they have the advantages of saving width and height. In each case they save weight and save time in erection.

Examples of the range of M. and C. grit-proof idler rollers will also be shown.



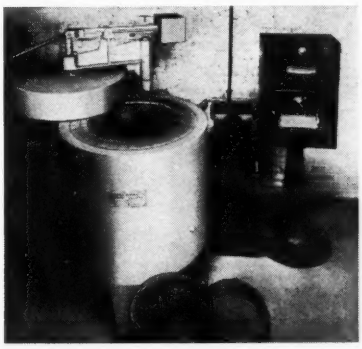
Applications of the M. & C. sectional belt conveyor will be shown by this model

M.C.L. & Repetition, Ltd. (D. 406)

Repetition parts will be produced from all types of metal in various shapes and sizes. Constant - current generators, controllers and starters will also be represented.

Metalectric Furnaces, Ltd. (Cb. 504 & 605)

An electric box-type general heat-treatment furnace, rated at 20 kVA, is in general use for annealing, carburising and reheating. It operates under conditions of extreme economy at all temperatures up to 1,000 deg. C. Special features are the precision automatic temperature control, high thermal efficiency and simplicity of operation. The chamber dimensions are 24 in. by 13 in. by 12in. For tempering operations and low-temperature treatment of light alloy pressings and components, a vertical air circulation furnace (illus.) suitable for operation at all temperatures up to 700 deg. C., embodies a fan which provides for adequate air circulation, thus ensuring uniform heating of the charge. There will also be a replica of a 12/15-ton Metalectric-Tagliaferri 3-phase direct-arc type melting furnace, a feature of which is its simple design and consequent simplicity of operation, enabling the average maintenance engineer to make normal working adjustments. Hydraulic operation is employed throughout and the patent Metalectric-Tagliaferri regulator is incorporated for electrode control.



Metalectric air-circulating furnace

Metlex Industries, Ltd. (A. 512)

Several of the new articles of bathroom furniture to be shown incorporate illuminated mirrors.

Midland Fan Co., Ltd. (A. 612)

Among spray-finishing equipment the new "Alpha" spray pistols should meet the demand for medium-priced apparatus for finishing electrical equipment. Other products are an electrically driven automatically controlled air compressor set, exhaust fans with flameproof motors, and sheet-metal work as used for dust extraction plants.

Midland Metal Spinning Co., Ltd. (Cb. 410)

Since the last B.I.F., kettle bodies suitable for electric kettles have been produced in polished copper, nickel-plated and chromium-plated finishes. "Tower Brand" super-speed hotplate cooking utensils have been specially designed to avoid distortion, with ¼-in. machine-ground bases, solid-drawn walls of uniform thickness and patent reinforced edges to give additional rigidity. Especially interesting items are kettles with audible alarms in the lids, a chromium-plated percolator and a steamer enabling a complete meal to be cooked on one hotplate.

Mirrlees, Bickerton & Day, Ltd. (B. 322)

A "Mirrlees-Combustioneer" automatic stoker (illus.) will be seen firing a Ruston "Thermax" vertical boiler in which the steam pressure is automatically maintained by a thermostat which stops and starts the stoker. The water-level in the boiler is also automatically maintained by Royles float-controlled switches.

With a similar equipment applied to an "Ideal" sectional boiler, arrangements can be made whereby during the night or warm weather a single tumbler switch will automatically reduce the draught delivery of coal to the boiler. This is effected either by a separate thermostat or a time switch. The stokers can be used not only for steam raising and water heating, but also for providing controlled heat to many industrial furnaces, grass-drying stoves, bakers' ovens, vitreous enamel furnaces, etc. Another interesting exhibit is the Mirrlees "Imo" pump, which has only three moving parts.

A "Mirrlees-Combustioneer" automatic stoker

Modern Woodworking Machines, Ltd. (B. 320)

Nearly all the woodworking machines shown will be electrically driven. The company's new "Mite" sawbench for 8 in. saws is suitable for either wood or metal cutting and every possible adjustment is arranged for. The guarding satisfies Home Office requirements.

Moffats, Ltd. (Cb. 509)
Besides a model kitchen there will be a general display covering the whole range of refrigerators and cookers. The

Three of the latest cookers: The E.E. "H.C.212" with "Ritemp" control, the Moffat "H.954" and the G.E.C. "D.C.100"

latter will include the new "900" series (illustrated), features of which are the indicating type "Therm-O-Matic" control; practically indestructible slow-break switches; protection of porcelain enamel cooking top from excessive heat by means of insulating rings; reinforced all-steel construction; flush sides and front; one-piece cooking top and back splash-plate; improved element recessing; and a new balanced oven door. All models are made with three or four hot-plates. An electric vitreous enamelling furnace will be in operation and to show the durability of the vitreous enamel a cannon will "fire" metal balls at a specimen.

Morecambe Electrical Equipment Co., Ltd. (Cb. 708)
To meet the requirements of the Factories Act regarding the provision of apparatus for quickly stopping engines and power units, this company has developed a range of electrically operated stop-motion and valve-closing apparatus. Both DC and AC units are available and a safe low voltage only is applicable to the stop motion, no alterations therefore being required in existing apparatus. A special key provided enables the instrument to be kept under the control of responsible persons.

The pillar type control panel illustrated on page 231 is suitable for controlling a slip-ring type motor to give 50 per cent. speed variation. Inching and stop buttons are provided. The rotor starter regulator is interlocked electrically with the stator contactor, and an isolator at the bottom of the case can be adapted for either hand or foot operation.

Air-break control gear of the hand-operated and automatic contactor type will comprise direct-to-line, star-delta, stator rotor and reversing starters, while oil-immersed hand-operated gear will consist of direct-to-line, star-delta, and combined stator rotor starters.

David Moseley & Sons, Ltd. (D. 630)
Anti-corrosive rubber for linings and coverings, rubber and vulcanite roller coverings, mechanical and moulded rubber goods, hose, gloves, vulcanite, &c., will form this exhibit.

National Time Recorder Co., Ltd. (B. 722)
The "National" patent electric self-winding transmitting master clocks and dials will operate from AC or DC mains or from batteries, the current consumption being negligible. The time recorders shown will be of the latest all-electric metal-cased type.

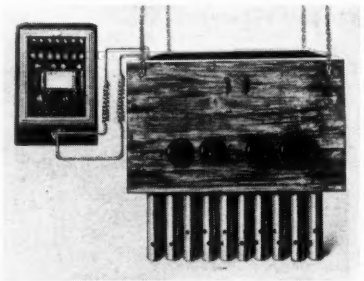
James Neill & Co., Sheffield (D. 527 & 529)
The difficulty of holding both thin and small parts during machining operations is overcome by the new "Eclipse" adaptor plate, made by these manufacturers of the well-known "Eclipse" non-electric magnetic chucks and hack-saw frames and blades.

Newalls Insulation Co. (D. 521)
Moulded asbestos has been developed for the fire protection of girders, stanchions and electric cables. Four grades of insulation bricks cover temperatures up to 2,450 deg. F. A section of a cold room will demonstrate the method of erecting "Nonpareil" cork-board, while a model will show the effect of treating ducting against noise transmission by using "Paxfelt." Asbestos "Paxtiles," for acoustic correction, will also be demonstrated.

L. H. Newton & Co., Ltd. (D. 224)
This company produces bolts, nuts, screws, studs and washers; special capstan and automatic work; small pressings and bent-wire parts; and (under sublicence) Parker-Kalon screw and drive nails.

Nivex Instrument & Gauge Co., Ltd. (Cb. 720)
See "Runbaken Electrical Products."

O.C.P. Marketing Co. (D. 718)
The O.C.P. method of electrically



O.C.P. water-conditioning plant

conditioning water for boilers, steam plants, Diesel engine jackets, etc., is automatic in operation and does not (like chemical softeners) require close adjustment for variations in the chemical composition of the water. The initial cost of the plant is said to be about one-third that of an equivalent chemical plant and an almost negligible amount of electricity is consumed, no form of regeneration being required. The process works by bringing about a physical change in the mineral salts in solution in the water.

Oldham & Son, Ltd (Cb. 116 & 213)
All types of miners' electric safety lamps, including automatic electric cap lamps, will be found on this stand, while the latest gas detectors and automatic gas alarms, among which is a combined electric hand lamp and gas detector (illus. p. 228), will be demonstrated. Battery and control equipment for standardising indicating wattmeters, etc., will be seen under test-room conditions. Emergency lamps for A.R.P. work will also be represented, together with standard-type batteries.

Omes, Ltd. (D. 419)
Forgings produced by electrically upsetting the bar before forging of the shape or form takes place will be displayed. One advantage of the electrically upset forging process is that finished bars can be used, eliminating practically all machining and often other operations as well, while the forgings possess increased strength, inasmuch as the grain flow of the metal is not shattered or disrupted. There is no taper and the forgings are nearly scaleless, being practically finished to size.

Ozalid Co., Ltd. (Cb. 707)
The new all-metal electrically driven developing machine, type "R," has been devised for the speedy, economical and simple dry development of "Ozalid" positive photoprints on sensitised paper, opaque cloth, handkerchief cloth, transparent paper and tracing cloth. Its current consumption is only 2.4 A, and it requires the minimum of attention

Packless Gland Co., Ltd. (Cb. 700)
See "British Thermostat Co., Ltd.

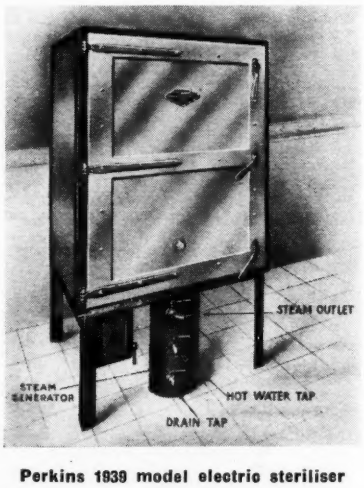
P.B. Sillimanite Co., Ltd. (Cb. 616)
The outstanding feature of the refractories made from "P.B. Sillimanite" for electric radiators, immersion heaters, cookers, etc., is their high electrical resistance even at high temperatures. The company can now offer the manufacturers "P.B. Sillimanite" in finer gradings for the more accurate manufacture of these refractories, particularly the finer threads required on the tubular-type elements in reflector-type fires. The company's products are extensively used in the construction of trucks employed in electric pottery kilns, and a replica of one of these will be shown.

Henry Peace, Ltd. (Cb. 612)
Visitors to this stand will see tips, segments, fingers, controller contacts, etc., together with overhead equipment for tramways and trolley buses.

Non-ferrous products include: Castings in copper, gun metal, commercial Admiralty, brass and aluminium.

Peglers, Ltd. (B. 421)
Brasswork for engineers and plumbers is a speciality of this company, which in conjunction with the British Thermostat Co., has produced what is believed to be the first all-British thermostatically controlled shower valve.

Perkins Clean Milk Equipment, Ltd. (A. 621)
The 1939 model electric steriliser (illus.), which raises steam from cold in four minutes, is of all-metal construction, insulated all over with "Insulite." Automatic cut-outs make it impossible for the heaters to burn out. A steam generator is fitted for sterilising milking machines or operating a steaming stool. Another exhibit will be an all-metal sterilising chest, completely galvanised after manufacture, with pressed-steel door frame, aluminium polished panel, steel frame and legs. The "Duo" electric bottle washer cleanses twenty



Perkins 1939 model electric steriliser

bottles per minute, four hours' running using only one kWh.

Permaheat (Cb. 718)
Permaheat "Doublesafe" blankets and pads have an entirely new thermostatic construction ensuring greater safety. In the "Eiderwarm" a blanket is incorporated with an eiderdown, while the "Travelux" is a pad in special covering and case for use at home or away. Special A.R.P. blankets, made for use in shelters and for evacuation work, operate either on 12-V or dual (12 V/230 V) cir-

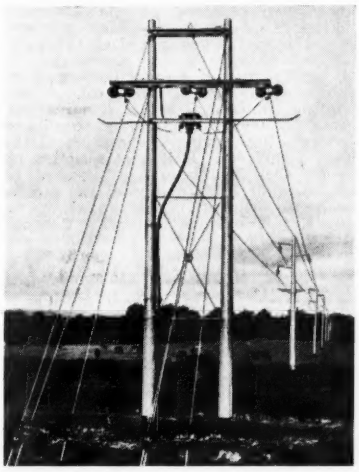
cuits. The "Ambulance" model gives three heats and works from a 12-V battery.

P. & H., Ltd. (Cb. 501)
See "Joseph Lucas, Ltd."

Pinchin, Johnson & Co., Ltd. (B. 516 & 617)
The main exhibit will comprise customers' products finished by them with P.J. materials. The well-known "Vigorised" wet-on-wet finishes will figure prominently, and a special feature of the "Vigorised" exhibit will be A.R.P. paints, designed to withstand the exacting conditions experienced during decontamination. "Venus" wood finishes and various decorative finishes will also be shown.

Pitter Gauge & Precision Tool Co., Ltd. (Cb. 312)
See "British Mechanical Productions, Ltd."

Poles (1938), Ltd. (Cb. 508 & 609)
The tapered design of the "Adastra" galvanised sectional steel lighting and



"Adastra" poles for 33-kV transmission lines (Poles (1938), Ltd.)

overhead transmission poles (illus.) presents a pleasing appearance, while the light weight makes for economical transport and erection. A lighting standard for overhead electric supply is of exceptionally attractive design. With the "Adastra" climbing shoe, any pole can be scaled with speed and safety, without damaging the paint.

Power Centre Co., Ltd. (Cb. 612)
Modern distribution equipment will include improved fittings for the company's patent turret system, and flameproof and under-floor cable trunking will be on show for the first time. The patent bus-bar trunking, which is especially applicable to ring and rising mains, can now be made water-tight if necessary, and completely new distribution boards specially designed for use with it will be shown. To facilitate extensions new types of switchboard are now available in unit form.

Prior Burners, Ltd. (B. 303 & 202)
Designed for use with any existing vertical or horizontal boiler, the Prior "Mastoker" automatic stoker illustrated is an underfeed unit, the fuel hopper being connected to the burner by a worm feed. A fan supplies air for combustion, and the worm gear is driven through a five-speed gearbox by an electric motor. The control is automatic, resulting in the maintenance of steam pressure, as well as water or air temperature, at any chosen figure. There is claimed to be a saving of up to 40 per cent. on fuel, since cheaper grades of coal can be used, and up to 85 per cent. on labour charges. A marked absence of smoke, soot and coal dust also results. The stokers are available in sizes to deal with steam boilers from 100 lb. an hour to 10,000 lb. an hour evaporation, or for water boilers from 75,000 to 10,000,000 B.T.U.'s.

Pyrotenax, Ltd. (Cb. 712)
Considerable progress has been made

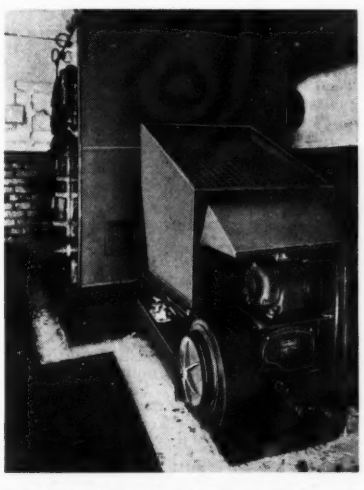
Pyrotenax mineral insulated cables used in a canteen

with the company's mineral insulated fireproof metal-clad (copper) cables, and many important installations have been carried out recently (illus. above). Besides a display of these cables and accessories, there will be demonstrations of the mechanical abuse to which the cables may be subjected and also current overload tests. The cables are used with standard electrical fittings.

Rapid Magnetting Machine Co., Ltd. (Cb. 412)
An improved magnetic separator known as the "Rapid" electro-magnetic percolator (illus.), for removing particles of iron, &c., from liquids used in the enamelled ironware, pottery, glazed tile and sanitary ware trades, will be shown for the first time. The principal feature of the improved design is that, instead of having magnet bars with projections and serrations, a box-like frame (detachable for cleaning) is fitted on the top of each magnet containing a mass of woven wire with a small open mesh. A slightly smaller box frame is situated between each pair of magnets. The bottom of the trough is thus completely covered with a mass of magnetic wire.

For separating loose iron and steel from all classes of non-ferrous swarfe, the "Rapid Multi" self-cleaning chute type separator will again be exhibited, other equipment being the drum-pattern separator for dealing with swarfe and borings; the "V" magnetic separator for use when the percentage of iron is small, "Biaflux" drum machines for handling granulated sugar, foundry sands, crumb rubber, &c., and special apparatus for dealing with feebly magnetic ores. The company, which claims to have built the largest electro-magnetic drum in the world, also specialises in large electro-magnetic clutches and torque limiters.

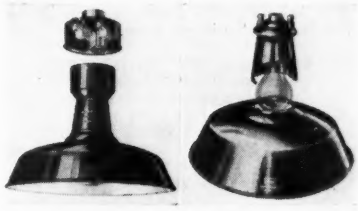
Rawlplug Co., Ltd. (Cb. 210)
Demonstrations will be given of "Rawlplugs," "Rawlbolts," bolt anchors, white bronze plugs, "Rawlplastic," plastic plugs, screw anchors, "Rawldrives," mechanical hammers, tile drills and boring tools. For exterior and interior fixing to brick, concrete, stone, cement, marble, &c., the new screw anchor has been produced to meet a demand for an anchor made of metal that would resist climatic conditions and overcome prejudices against non-metallic fixings, without sacrificing the advantages of resiliency associated with the fibre "Rawlplug." The "Rawldrive," a screw that is fixed with a hammer, is another new product.



Prior "Mastoker" side firing a Britannia boiler

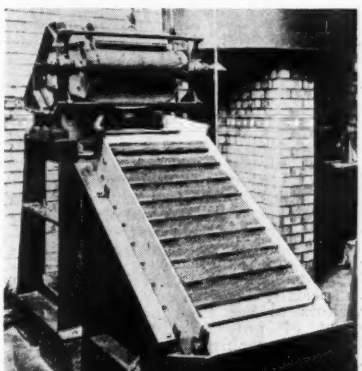
Redmanol, Ltd. (Cb. 408)
Bakelite synthetic resin products are made by this company.

Revo Electric Co., Ltd. (Cb. 304 & 405)
A new streamlined cooker will contain novel features both in construction and appearance. The new "Dinkie" table cooker, on view, is intended for the small kitchen. It is hoped that a new and unusual boiling plate will also be ready for the Fair.



Revo "Saferlite" and "Passalamp" reflectors

Cookers will be seen with "Superspeed" radiant boiling plate, the semi-radiant tubular type boiling plate, and three- and four-heat enclosed-type boiling plates, as well as the "Revostat" automatic oven control. In addition to



"Rapid" electro-magnetic percolator

the already well-known range of irons, kettles, toasters, wash-boilers, panel and tubular heaters, boiling rings, &c., a new iron will probably be introduced. New fires include imitation coal, inset, outset, and inexpensive cast and sheet metal models.

Developments in street lighting will be apparent from the latest fittings for sodium, mercury and fluorescent lamps, while among new industrial units will be the "Saferlite" and "Passalamp" reflectors (illustrated); in the former the lamp and reflector can be removed together and in the latter the reflector fits over the lamp. Special units for mines will also be featured. In the Outdoor Section of the Exhibition street lighting standards, brackets and fittings will be seen actually erected on specimen roadways. Road signs and guard posts will also be shown. The remainder of the exhibit comprising fans, switch and fusegear, and woodwork for electrical purposes.

Rheostatic Co., Ltd. (Cb. 310 & 411)
Among a complete range of temperature controls attention is drawn to the "CS" cooker thermostat. This is now available with an artistically moulded control knob which not only complies with the recent E.D.A. recommendations

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but also has a built-in pilot light. Space-heating controls for central heating installations will include room and immersion thermostats together with motorised valves. Under this heading, the "Satchwell" compensator control is believed to be the first all-electric device of its type to be exhibited at the Fair. It controls the flow-water temperature of central heating installations in accordance with outside weather conditions and so allows the heating capacity of the plant to be automatically adjusted to meet changing conditions. Controls for automatic solid and liquid fuel firing plants will include the improved "SC" panel for automatic stokers. For steam boiler installations a range of pressure switches, combination low-water cut-outs and feed-water controls will be shown. A new device is a surface-type thermostat of greatly improved design and current-carrying capacity.

A complete panel as installed in a large heating installation will illustrate the operation of many of the controls and will include a "Duplex" relay to provide automatic change-over to stand-by plant. The "Satchwell" type "Z" and "Y" immersion thermostats for water heaters will also be on view.

Riley Stoker Co., Ltd. (D. 222 & 321)

The new class "B.7" underfeed stoker, which incorporates all the features of the "B.5" machine, has been specially designed to fire the larger types of boilers, burning up to 850 lb. of bituminous coal per hour. It can be arranged for automatic control by pressurestats or thermostats. The "Robot" industrial automatic stoker will be shown in two sizes. A feature of all Riley stokers is automatic regulation of the rate of feed of both coal and air to suit the load on the boiler.

Robbins & Bradley, Ltd. (Cb. 500)

Swivel top arms to simplify cleaning are a feature of an attractive three-light pendant, which will be found among a new range of lighting fittings to be shown.

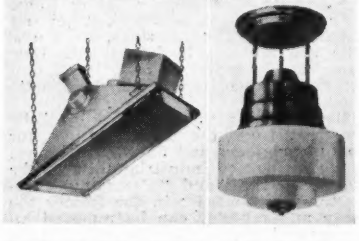
Rotax, Ltd. (Cb. 501)

See "Joseph Lucas, Ltd."

Rowlands Electrical Accessories, Ltd. (Cb. 102 & 103)

What is claimed to be the largest exhibit of lighting fittings ever displayed at the Fair—it covers 1,400 sq. ft.—has been divided into two sections. In one there will be a comprehensive range of industrial, commercial and floodlighting fittings, while in the other various lighting effects will deal principally with the degrees of colour corrected mercury lighting. A number of identical displays in specially designed cubicles will enable visitors to see from one position the effect of properly corrected mercury lighting as against mercury and gas-filled lighting.

Of particular interest are the two "B.L.P. Super Mix" fittings illustrated. The one on the left is a display window fitting giving a remarkably close approximation to natural daylight, while the



Rowlands "B.L.P. Super Mix" fittings

other fitting gives the same degree of colour correction but is designed for the illumination of commercial interiors.

Rozalex, Ltd. (Cb. 722)

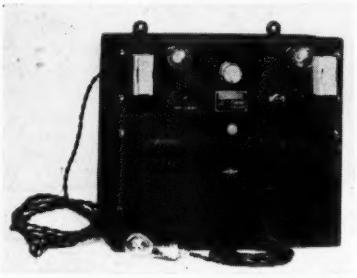
Attention will be drawn to the merits of "Rozalex" for the protection of workpeople against industrial dermatitis, etc.

Rubery, Owen & Co., Ltd. (D. 602 & 703)

This company's exhibits will consist of steel storage equipment for offices and works; adjustable steel shelving including special units for storing gas masks; steel and glazed partitioning, works screening, bins, racks, work benches, office furniture; steel-framed motor houses with roll-aside doors; nuts and bolts; pulleys; repetition parts; and steel pressings.

Runbaken Electrical Products (Cb. 720)

In addition to an electric soldering and brazing machine, electric engraving equipment, the "Easydun" electroplater and the "Testoscope" vest-pocket fault-finding instrument, it is hoped that

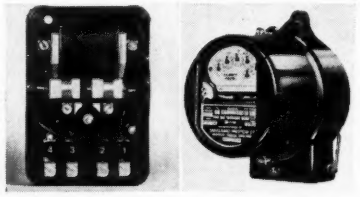


Runbaken "Instanta" emergency lighting set

another new line will be ready in time for the exhibition—the "Instanta" emergency lighting set (illus.). This can be readily connected to any AC or DC supply and requires no special installation, being self-contained and including trickle charger, accumulator and automatic relay. It will provide lighting for several hours at up to twenty points. By depressing a button it can be tested at any time.

Sangamo Weston, Ltd. (Cb. 402)

The new "HMT" single-phase watt-hour meter (illus.) is similar to the "HM" model, but is temperature compensated over a wide range and has a simplified power factor adjustment. Modifications of the series element eliminate any tendency to develop "current creep," while the potential coil, which is now contained in a neat, hermetically sealed insulated housing, forms a compact unit which is readily replaceable. The meter is built in capacities from 2½ to 50 A in the long range pattern and up to 100 A in the standard pattern, both types being housed in moulded bakelite. Multi-coin prepayment meters and variable rate fixed



British Thermostat "CY" dry contact relay and the Sangamo "HMT" meter

charge collector meters will also be shown.

Two new portable test meters are both suitable for long period dial testing as they include kWh dials in addition to the usual disc revolution dials. Model "11" is a single current range type for use with an external Classs A.L. multi-range current transformer: the other, model "12," is a self-contained multi-current range pattern. Two new multi-range current transformers suitable for use with sub-standard instruments will also be exhibited, as well as new metering current transformers housed in moulded bakelite, and the "AD" thermal demand meter.

Developments of the small synchronous bakelite housed switch type "S.S." are the "S.S.J." and the "S.S.K.," both for short period automatic time control. Two other new switches are a single-pole change-over type and a 25-A iron-clad unit. Among synchronous motors and clock movements will be the compact new model "7" synchronous motor unit specially developed in seven types for time switches, fixed charge collectors, etc.

Other exhibits will include AC polyphase watt-hour meters; test blocks; splitter blocks, m.d. attachments; ampère-hour meters; stop watches; measuring, indicating and testing instruments; the "E.772" radio analyser; and the "E.703" lightometer.

Scottish Development Council (B. 318)

An information bureau will give details of the facilities offered to new or expanding industries establishing themselves in the Scottish Special Areas. The industrial estates at Hillington, Carfin, Chapelhall and Larkhall are particularly suitable for light industries in the electrical trade.

Serck Tubes, Ltd. (D. 608)

Non-ferrous tubes in brass, copper, aluminium, gilding metal, bronze and Admiralty metal will be accompanied by other examples in alloys which minimise corrosion in circulating and cooling plants. The company's copper, with a guaranteed purity of 99.9 per cent. is especially suitable for bronze or copper welding, and the tubes are made in a temper suitable for manipulation without further heat treatment.

Simmonds Aerocessories, Ltd. (D. 421)

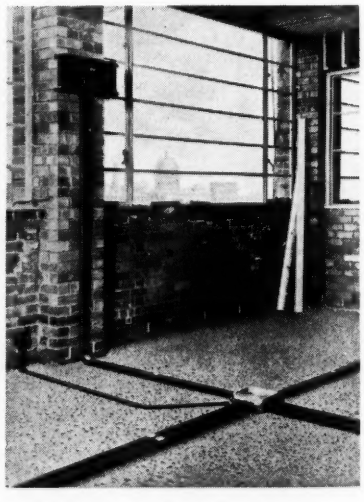
The manufacturing and selling rights have been obtained of the American "Fram" oil cleaner, which removes abrasives mechanically and all other impurities chemically and maintains the oil permanently clean and indistinguishable analytically from fresh oil. A new jointing compound, which remains permanently tacky, is ideal for conditions necessitating frequent separation of the jointed surfaces. It is heat resisting up to 400 deg. F. Other exhibits will be elastic stop nuts, stop bolts, remote push-pull controls, navigational instruments, "Wondegrip" non-slip flooring, etc.

Simplex Electric Co., Ltd (Cb. 314 & 415)

The "Creda" immersion type kettle

"Creda" immersion type kettle

(illus.) shown for the first time holds 3 pts. and is loaded at 1,500 W. Very fast boiling is attained: 1 pt., 2¼ mins.; 2 pts., 4½ mins.; 3 pts., 7¼ mins. The setting of the element close to the bottom of the kettle allows very small quantities of water to be boiled, and an automatic cut-out guards against damage. The handle is shaped to fit the hand and is balanced for pouring. Other products shown will include fires (including two insert models for builders' use), cookers, storage and immersion type water heaters



Simplex under-floor duct system

(including a new top outlet heater), wash boilers, tubular heaters, etc.

The Simplex under-floor duct system (illus.) is becoming popular for the wiring of large new buildings, since the interlaced grid of ducting formed enables the supply to be "tapped" at the ideal points. The "Monarch" range of heavy switchgear is again extended, as is also the range of conduit fittings. New items among lighting equipment will include fittings for sodium and mercury horizontal burning lamps, blended lighting units, fittings for A.R.P. lighting, an improved form of "Displex" reflector and "Prismax-Major" bulkhead fittings. The street lighting exhibits in the Outdoor Section will also be worth a visit.

J. O. Sipajlo (B. 716)

Various domestic appliances will include the "Dixram" combined portable electric griller, toaster, radiator and water heater.

W. R. Small, Ltd (Cb. 706)

Mica and micanite products of all kinds are made.

James Smellie, Ltd. (B. 519)

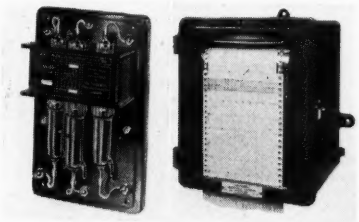
Three new fires will be shown. One, which is interchangeable with a coal fire of the dog grate or basket type, has a flush back and a heavy base. The "4572" with a new pierced design can be used either on the carpet or in front of the fireplace, while the similar but more elaborate "4571" (illus. p. 229) has half rounded sides and is cased completely in at the back. It has a heavy projecting stool, and piercing both above and below the elements.

Smith Meters, Ltd. (Cb. 100 & 203)

The type "A" single-phase ordinary meter and the type "A.P.F." prepayment meter, both straight and two-part tariff, will be accompanied by new polyphase meters of the two- and three-element patterns. A simple mechanism for incorporating in fires for use in hotels, etc., will be demonstrated.

Sordoviso Switchgear, Ltd. (Cb. 220)

All the mercury switches to be shown incorporate the Sordoviso non-tilting



Sordoviso multiple control unit and the Ether "Indicorder" recording and controlling pyrometer

mercury switch. A high-capacity unit will be seen operating on very heavy overload. In addition to the company's main range of relays and contactors, a new magnetic control system will be demonstrated in which the switch is operated by means of a small permanent magnet. It can be used for normal switching operations, as well as for such purposes as interlocking and alarm signals. Another new unit is a motor starter which uses mercury switches to give push-button control with various forms of no-volt and overload protection.

Demonstrations of main switch units under working conditions will include visual signalling systems of all types, multipole switches (illustrated) for group control (up to twenty-four poles), delay and time-lag switches for staircase lighting, syren control panels and flashers for signs, etc. Several forms of street lighting control are now being marketed, many to special requirements.

Spiral Tube & Components Co., Ltd. (D. 713)

In addition to the unit heaters, air heaters and coolers illustrating applications of the company's "Spiral Tube" heat transmission tubing, there will be the "Spirette" small unit heater incorporating a 5-kW element and now available as a *de luxe* model with a very attractive casing. A plenum heater range will also be represented, as well as evaporators and condensers for refrigerators.

Standard & Pochin Bros., Ltd. (B. 420)

The "Calorier" unit electric fan heater for industrial and public buildings has elements possessing an almost indefinite life. The same type of element is used in convectors particularly suitable for offices, etc. Another interesting product is the "Propelair" fan.

Sterling Cable Co., Ltd. (Cb. 119)

Cables and flexibles form the exhibit.

Stewarts & Lloyds, Ltd. (D. 400 & 501)

Steel pipes from $\frac{1}{8}$ in. to 72 in. diam. are made by this company for gas, water, steam and air, and a special feature will be made of protective linings and coverings, and also pipe joints, including several types of spigot and socket, welded and loose flange joints, as well as "Victaulic" joints and Johnson couplings. Pig iron and steel sections, coils of tube strip, castings and cast-iron heat-resisting moulds will also be represented.

Stirling Boiler Co., Ltd. (D. 300 & 401)

See "Babcock & Wilcox, Ltd."

J. B. Stone & Co., Ltd. (D. 231)

The "Burfree" nibbling machine is designed to cut mild steel plate from $\frac{1}{16}$ in. to $\frac{3}{16}$ in., and stainless steel up to $\frac{3}{32}$ in. The cutting tool consists of a circular punch and die, the latter being of two dimensions, namely, standard and close-fitting. Shearing tools are not incorporated as very little hand finishing is required. The clutch control mechanism is operated by means of a sliding support within easy reach of the operator, or by a foot pedal.

Streetly Mfg. Co., Ltd. (Cb. 506 & 607)

See "British Industrial Plastics, Ltd."

W. & S. Summerscales & Sons (A. 519)

Electric washing machines are among this company's products.

Charles Taylor (Birmingham), Ltd. (D. 612)

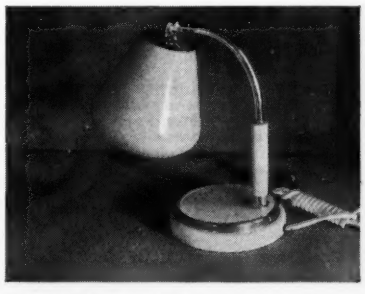
The Kennedy patent bending machines for bending (cold) tubes, bars, angles, tees and channels will be one of the items among a display of chucks, machine vices, brassfinishers' tools and accessories, capstan lathe tool holders, jigs and fixtures.

Taylor & Challen, Ltd. (D. 409)

The "1516" notching press is intended for notching rotor plates with a punching circle of from 6 in. to 48 in. Stator plates may be notched before separating the core on ring-cutting shears. Generally, a speed of 400 RPM is employed, though on the smaller sizes of sheet 600 RPM may be attained. To reach these speeds a special form of friction clutch is used. The index wheel, 20 in. in diameter, is readily detachable. The press will be shown working, together with an open-fronted press fitted with combination tools and a hot brass pressing machine.

Taylor Law & Co., Ltd. (Cb. 319)

Fumbling for the switch of the bedside lamp is eliminated in the "Tala



The "Tala Touchlite" (Taylor Law & Co.)

Touchlite" (illus.) by making the whole of the base act as the switch. An attractive range of metal and colour finishes is available.

Tecalemit, Ltd. (D. 316 & 415)

This company has further increased its range of high-pressure lubricating equipment and accessories for industrial and motor trade purposes, and of particular interest is the "Multi-point" battery for rolling mills, stone crushers, &c. The Tecalemit industrial tachometer has numerous applications.

Teddington Controls, Ltd. (Cb. 700)

See "British Thermostat Co., Ltd."

Telsen Electric Co. (1935), Ltd. (Cb. 106)

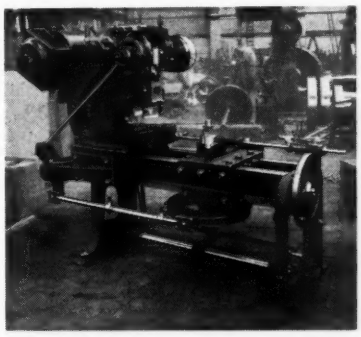
Domestic equipment will comprise hot plates in various designs and colours, warming plates, immersion heaters, soldering irons, and, if ready in time, a 400-W domestic iron with an unusually robust element, an illuminated shaving mirror, a bowl fire and a fan-heater.

A section dealing with measuring equipment will cover the lighter instruments, including radio valve testing apparatus, universal testers, a high frequency signal generator covering from 100 kc to 50 Mc in six ranges, resistance ranges, capacity analysers, panel type moving coil and moving iron meters in moulded bakelite cases, and various pocket-type meters.

Battery chargers will range from a midget type for charging a 2-V accumulator at $\frac{1}{2}$-A to 3-circuit, 6-A units. Metal rectification is used generally. Among automobile accessories seven types of aerials are available, as well as fog lamps, "stop" lamps, and a cell-testing voltmeter.

Herbert Terry & Sons, Ltd. (B. 424)

In addition to springs, presswork, wirework and automatically machined parts, a garage model of the "Anglepoise"



Taylor & Challen "No. 1516" notching press

lamp will be shown for the first time. Other "Anglepoise" units are available for aircraft, photographic, domestic, industrial, surgical and dental work. A special four-arm arrangement is suitable for dissecting tables, and a model is made for adjustable drawing boards.

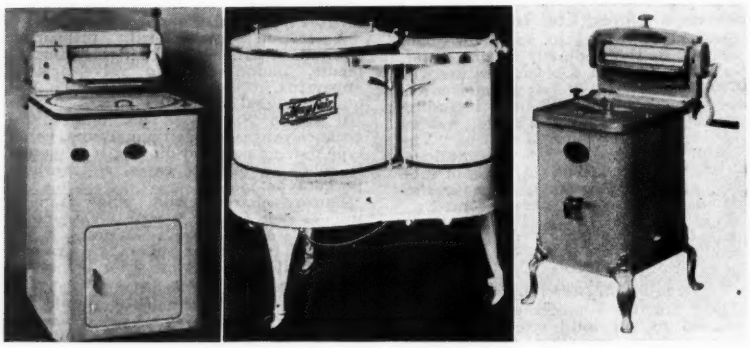
Bertram Thomas (Cb. 321)

This company's patent "Electric Buffet" (illus.) comprises a dinner wagon with hot-plate top and an electrically heated cupboard. The hot-plate top, which is provided with auxiliary plugs for toaster, &c., can be supplied separately. Another product, a plate warmer, provides very rapid warming, and its semi-nesting construction allows small overall dimensions. An electric greenhouse heater is designed to be placed under lattice type shelves. It comprises a low temperature galvanised tubular heater with a large heating surface surmounted by water troughs. A somewhat similar motor-car pre-heater incorporates two short tubular heaters in a tray. Improvements in "Tiltracks" include enclosed types to keep out dust

Bertram Thomas electric buffet

and dirt without impeding easy access to the contents.

John Thompson (Wolverhampton), Ltd. (D. 410 & 513)
A comprehensive display arranged by this company and other subsidiaries of the John Thompson Engineering Co., Ltd., will include a completely self-contained "Super-Economic" boiler of fusion-welded construction throughout and employing the contra-flow principle of heat exchange; a "Triumph" forced draught stoker working in a partly sectional boiler front; a self-contained "Vulcan" automatic stoker for firing sectional heating boilers, etc., and complete with built-in forced draught fan, automatic coal feed and six-speed gear box; a model of the controlled and forced circulation "La Mont" water tube boiler, which operates at 1,050 pounds per sq. in. pressure, and which has passed operating tests with an overall efficiency of over 86 per cent; photographs of typical complete boiler houses constructed by the company; and a submerged ash conveyor.



The Wilkins & Mitchell "Servis" washer, the "Mayfair Spindry" (MacGregor & McCallum) and the Burco "211" electrically heated, hand-operated machine

Thorn Electrical Industries, Ltd. (Cb. 711)
"Atlas" electric lamps will be seen.

Timmis & Co., Ltd. (Cb. 603)
A varied range of refractories will appear on this stand. The "Rayax" (Sillimanite) material gives excellent results in high-temperature furnaces.

Tube Products, Ltd. (D. 517)
This stand will be made from electrically-welded steel tubes, chromium plated. Stainless and mild steel tubes, displayed in sizes from 5-16 in. to 3½ in. o.d. and in gauges from 10 to 22, can be supplied manipulated. Electrically welded steel tube is being used largely for A.R.P. work.

Tudor Manufacturing Co. (Cb. 119)
The original designs of this company's pendants, wall brackets, standard and table lamps, in wood and metal, are mostly based on styles of the Tudor period. The fittings, which are not expensive, are all hand-made and are supplied fully wired, with chains, candle tubes, etc. Appropriate shades can also be provided.

Turner Brothers (Birmingham), Ltd. (D. 223)
This company specialises in the manufacture of press tools, jigs and fixtures for the aircraft industry. Pressings of unusual shape and design will indicate the wide range of business handled.

Turners Asbestos Cement Co. (Ca. 301)
Of special interest among asbestos-cement products will be "Sindanyo" and "Siluminite" asbestos electrical insulating materials, and also asbestos-cement materials for A.R.P. work.

United Steel Coys., Ltd. (D. 512 & 613)
"Silver Fox" stainless steel is employed largely in the construction of this stand, on which will be seen irons, steels and alloys for all purposes.

Van Dorn Electric Tools (Cb. 511)
See "Black & Decker, Ltd."

Waddicor ("Bradite") Ltd. (Cb. 208)
Examples of industrial and decorative enamels will form this display.

C. C. Wakefield & Co., Ltd. (Cb. 301)
Most of a comprehensive range of mechanical lubricators, grease guns and oil storage installations will be seen working. Exhibits of particular interest will be a patent conveyor chain lubricator and the type "S" mechanical lubricator.

James Walker & Co., Ltd. (D. 422)
This exhibit will cover "Lion" packings, jointings and mechanical rubber goods for all pressures and temperatures of steam, fluids or gases.

H. W. Ward & Co., Ltd. (D. 315)
This exhibit will consists of the latest designs of tools, toolholders, chucks and accessories for capstan and turret lathes.

Westinghouse Brake & Signal Co., Ltd. (Cb. 510)
Numerous new applications of the Westinghouse metal rectifier will be demonstrated. The difficulties of voltage drop and variations in output with fluctuations in load and mains supply usually associated with rectifier mains units have been overcome by the new "Westat" constant potential system. This works at an extremely high overall efficiency, and, when working at or near full load, simultaneously provides a conversion from single-phase feed to a three-phase rectified output. It can be used to operate a constant potential floating battery system.

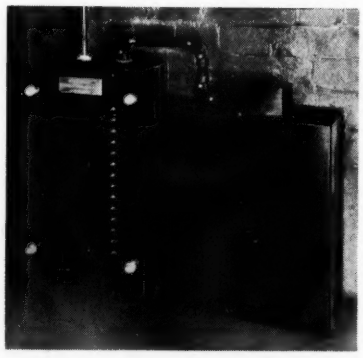
To deal with cinemas operating on single-phase mains, a small and relatively inexpensive static phase convertor (illus.) has been developed. Electro-plating, circuit breaker operation, battery charging and trickle charging, and the operation of cinema projector arcs, a model railway, teleprinters, a weighing machine, a magnetic chute and a lifting magnet and motor will also be demonstrated, and there will be a representative display of rectifiers for change-over purposes, electric vehicle battery charging, cable testing, etc.

Whyte & Colling (B. 509)
Electric fires are made in attractive designs.

Wild-Barfield Electric Furnaces, Ltd. (Cb. 204 & 303)
Electric furnaces exhibited will range from small laboratory muffles to apparatus for industrial use. Owing to their robust construction and reliability, some of the small furnaces can be used in factories for hardening small tools, etc. Suitable for carburising, reheating, normalising, etc., a box-type furnace has a hearth 4 ft. by 2 ft. wide fitted with patented "Tubular Hairpin" heating elements designed for continuous use up to 1,100 deg. C.

For high-speed steel hardening three equipments will be exhibited—a small twin-chambered unit for toolroom use, a larger unit comprising two separate furnaces, and an electrode salt bath (illus. p. 230).

For low temperature treatments below 700 deg. C there will be two vertical forced air circulation furnaces, one fitted with the charge progress recorder and intended for production, the other smaller model for tool-room and experimental purposes. Both are fitted with patented contrifugal fans giving a high output of work and very close temperature uniformity. Of considerable interest to the light alloy industry is a small self-contained batch furnace with forced air circulation and automatic temperature control. The Vickers "Pyramid" hardness tester will also be shown.



Westinghouse static phase convertor

The furnaces manufactured by G.W.B. Electric Furnaces, Ltd., are too large to exhibit, but photographs of recent installations will include views of what is believed to be the largest electric billet heating furnace in the world. This will be used in conjunction with the largest extrusion press ever built by the company. The rating of this furnace is 600 kW. The capacity is forty billets, each 20 in. diameter by 4 ft. long and weighing over 14 cwt., and the output is four an hour.

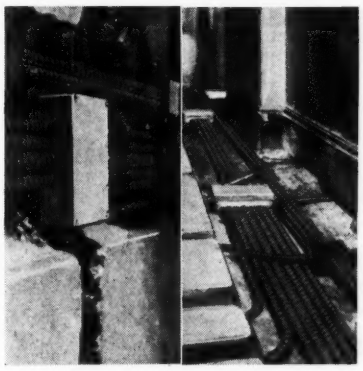
A 150-kW scale-free annealing furnace (G.W.B. Electric Furnaces, Ltd.)

Another recent installation comprises a complete scale-free annealing plant for steel bars (illus.), with protective atmosphere supplied by the company's latest type of town's gas plant. Other photographs will show conveyor furnaces for aluminium billet heating, bell-type bright-annealing furnaces and equipments for nitriding, tempering and many other heat-treatment processes.

Samples of "Eternite" case-hardening compound will be on view, together with Shell-Wild-Barfield quenching oils, "Kleenard" open-hearth compound, "Speedicase" hardening paste and "Nokase" anti-carburising mixture.

Wilkins & Mitchell (Cb. 604)

Refinements to look for in the "Servis" washing machines (illus. p. 240) are the balanced pressure on the wringers, rollers and the quick-release lever; "Oilite" phosphor bronze bushes requiring no lubrication; machine-cut gears; double-ended drip tray; dual control for operating and agitation and stopping and starting motor; anti-splash rim; runners for guiding the wringer into the cabinet when stowing it away; and rubber mounted, splash-proof motor. A new *de luxe* model will be shown for the first time.



Wrapping of conduits as a protection against corrosion (Winn & Coales)

Williams (Birmingham), Ltd. (A. 312 & 413)

"Atlas" aluminium ware, electric kettles and irons will be found on this stand.

John Williams & Sons (Cardiff), Ltd. (D. 237)

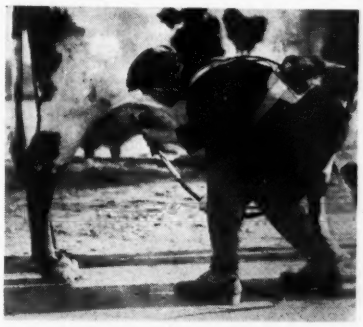
Many of this company's castings in cast-iron alloys are well known under their own names, such as "Ni-hard," "Ni-Resist," "Silal" and "Nicrosilal." The company also makes castings in nickel iron, molybdenum iron, 30 per cent. chrome iron, and high-strength irons to meet the new B.S. Specification.

Winn & Coales, Ltd. (Ca. 296)

"Denso" anti-corrosive wrapping (illus.) provides a safe and sure method of completely protecting pipes, cables and other metalwork liable to suffer from corrosion, no matter whether the position is above or below ground, or the corrosive influence acid, alkaline or electrolytical. Specimens will illustrate damage suffered by unprotected pipes, and also the excellent condition of pipes protected with "Denso" in similar positions. Frost-proof grease provides a sure safeguard against the freezing of manhole covers, etc., "Denso Therm" preparations being available in place of "Denso" for positions subject to heat. "Densolene" liquid anti-corrosive preparation is just as effective on rusted surfaces as on new. A film will deal with the application of "Denso" anti-corrosive products to the electrical industry.

Wolseley Sheep Shearing Machine Co., Ltd. (D. 705)

The Government's clean milk campaign has led to a considerable increase in the demand for cattle clippers (illus.) several different types of which are available. Among sheep-shearing machines prominence will be given to a two-bracket portable electric unit.



Clipping with a Wolseley "Clipkit"

Yorkshire Copper Works, Ltd. (B. 632 & 723)

A pylon of condenser tubes in cupronickel 70/30 alloy and also "Yorcalbro" (aluminium brass) will form an imposing feature of this stand.

Zinc Alloy Rust Proofing Co., Ltd. (D. 732)

Electrical conduit, ironwork, etc., treated by the sherardising rust proofing process will include specimens demonstrating the exceptionally long life of sherardising under exposed conditions.

London Exhibits

A.B.E.C., Ltd. (D. 1141)

Escapements for clocks, time switches and instruments will be on view.

Abrahams & Co., Ltd. (D. 1120)

Among a range of glass and china ware on this stand will be a selection of electric lamps.

Ardente Acoustic Laboratories, Ltd. (A. 699 & 704)

A new range of "Touchphones," known as the "Duocall," "Selectacall" and "Multicall," is proving very popular, especially among business and professional people. A new "PMRE" loud speaker (illus. p. 243) is specially designed to operate under the most rigorous weather conditions. A new correction equipment for use in churches comprises a single amplifier with two separate outputs, one to take earphones and the other diffusion units mounted in various parts of the church.

Ashdowns, Ltd. (A. 741)

This company makes various precision mouldings for the electrical trade as well as a moulded electric fire.

Baird & Tatlock (London), Ltd. (A. 685 & 698)

Laboratory instruments of all kinds are a speciality of this company.

Bakelite, Ltd. (A. 763 & 769)

See description of exhibits at Birmingham.

Charles Baker (A. 663)

The Smith wear and lubricant tester is designed to investigate the abrasive or lubricating qualities of metals and lubricants. Its operation is largely automatically controlled. A micrometer measuring microscope will also be on view on this stand.

Baker Platinum, Ltd. (E. 1212)

Exhibits will include precious metal contacts, solid and composite, several electrical mechanisms showing the application of the contacts, assembled contacts, composite strip for contactors, resistance and fuse wires and thermocouples.

Beatty Bros., Ltd. (Earls Court. 243 & 244)

Of special interest among a range of washers will be the new "SB" model with a 3-kW water heater situated directly under the agitator. A self-feeding wringer is fitted with a double-acting quick release which stops the rollers at the same instant that it releases the pressure.

Belgrave Electric Co., Ltd. (F. 1376)

Wrought iron lighting fittings, floor and table standards, real skin lampshades, pottery figures and table lamps and electric clocks will form the bulk of this exhibit.

Bellingham & Stanley, Ltd. (A. 657)

Among optical testing instruments there will be a projection refractometer and projection saccharimeter employing a sodium lamp.

O. D. Binger (Sales Aids), Ltd. (D. 1121)

All kinds of electrically operated animated advertising displays will be seen working.

British Alabaster & Arts Co., Ltd. (G. 1531)

There will be new designs of fittings in English alabaster and a period two-candle wall bracket similar to those supplied for an old Queen Anne panelled room at Chelsea. A special feature will be made of the reproduction of Adam period lighting vases, and there will also be new table lamps in alabaster and with figures.

British Elec. Domestic Appliances (1938), Ltd. (H. 1655)

See description of exhibits at Birmingham.

British Plastics Federation, Ltd. (A. 773)

This trade association deals with all phases of the British plastics industry.

British Vacuum Cleaner & Engineering Co., Ltd. (D. 1137 & H. 1655)

"Goblin" vacuum cleaners will be accompanied by the new "Popular" washer at an unusually low price. "Goblin" clocks will include models combined with a barometer and thermometer and also a combined table lamp and clock. The well-known "Teesmade" automatic tea-making outfit is now available at a reduced price without the clock.

Bylock Electric, Ltd. (H. 1666)

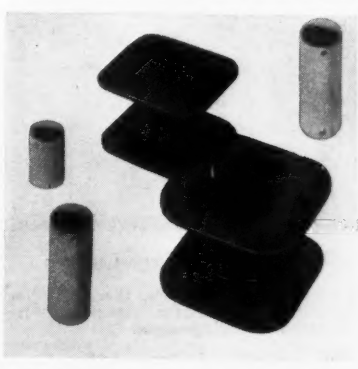
All the vacuum cleaner motors have been re-designed and in the case of the "Bylock," "Duplex" and all the large range of non-proprietary cleaners, the motors are of an entirely new type, eliminating all castings. They are suspended by means of four expansion springs which take up all shock. The industrial cleaners, hair-dryers and floor-polishers also have improved motors, with silent non-oiling bearings. There is also a warming pad for beds.

Cable & Wireless, Ltd. (Earls Court 219)

Special attention will be drawn to the recent reduction of charges. Illuminated photographs will indicate the seven stages in the transmission of a message, while a series of cut-outs will trace communication from the runner to the telegram of to-day.

E. K. Cole, Ltd. (A. 756)

This stand will be primarily designed to demonstrate the facilities available at



"Ekco" pierced and threaded formers and bobbins to 0.001 in. accuracy

the Southend-on-Sea moulding plant. Among the exhibits which will emphasise the widespread use of plastic materials will be some of the largest contemporary mouldings, such as heater and radio cabinets and table tops more than 2ft. in diameter; one-piece framings of intricate shape and section; mouldings from split and threaded dies to 0.001in. accuracy; and precision tapping and insert work. Among industrial mouldings there will be pre-payment slot meters, junction boxes, sealing chambers, telephone parts, electric razor casings, a wide variety of bobbins, formers and tubes, fuse boxes, plugs, adaptors and switch cases.

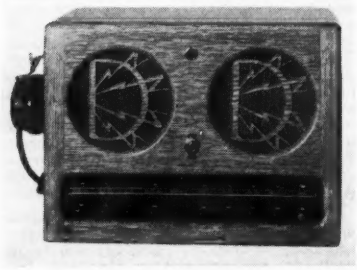
Crystal Glass Co. (C. 1059)
Table lamps will be found among a display of glassware.

Thomas De La Rue. (A. 744, 755 & 802)
This display will show a large variety of mouldings for different industries. Of special interest are the telephone handsets in thermo-plastic material, ventilation equipment, radio cabinets, hair-dryers, line insulators and terminal blocks. The housing, rotor and impellor of the "Cond-Air" air purifying equipment (illus. p. 243), described in our last week's issue, is also made of this material.

R. H. Dent, Ltd. (A. 699 & 704)
See "Ardente Acoustic Laboratories, Ltd."

Dernier & Hamlyn, Ltd. (F. 1395)
On this stand will be shown a new range of lamp shades, table lamps and shades in silk and vellum. The range of "Litlux" bed-lights has been extended.

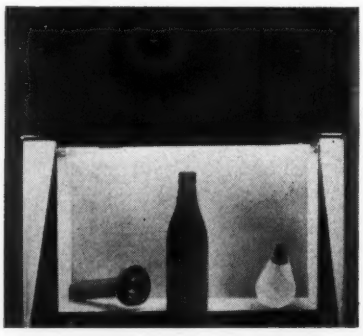
Dictograph Telephones, Ltd. (A. 784)
The latest model moving-coil loud-speaking telephones (illus.) with moving-



"Dictograph" loudspeaker telephone

coil speakers will be shown, together with all standard "Dictograph" inter-communication systems with finger-tip control. An automatic door control will also be of interest.

Dominion Electrical Co. (D. 1122)
"Lite-on" products will include animated displays and signs with a neon effect. A transformation cabinet (illus.) appears gradually to transform one article into another, while a mystic sign shows an object suspended apparently



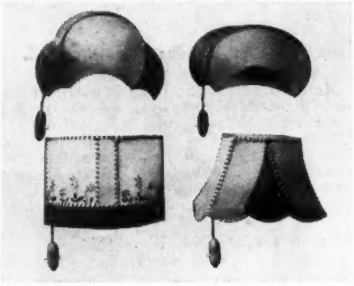
Dominion transformation cabinet

in mid-air. In addition, there will be daylight signs, mirror signs and illuminated swinging signs.

J. M. Doughty & Sons, Ltd. (Earls Court 144)
Wrought iron exhibits will include floor standards and table lamps.

Ebonestos Industries, Ltd. (A. 743)
A complete range of mouldings will be shown, made by the compression or injection processes, in "Ebonestos" compositions, including bakelite, urea, cellulose acetate, vinyl and other synthetic resins.

Electric Art Shades (1928), Ltd. (F. 1353)
In addition to pendants, table lamps, floor standards and bedlights, special ex-



A selection of shades by Electric Art Shades

hibits will include a new range of nursery table lamps, a selection of low-priced bedlights and a lamp made from a carboy.

F. W. Elliott, Ltd. (D. 1142)
Both reproduction and modern style electric clocks will be on view, clock movements and cases being obtainable separately.

Elliott & Spear, Ltd. (F. 1360)
Lampshades and table lamps will form a large part of this exhibit.

Enfield Clock & Watch Mfrs., Ltd. (D. 1126 & 1129)
This company makes all kinds of clock movements and complete clocks, including electric models.

English Clock & Watch Mfrs., Ltd. (D. 1141)
See "Smith's English Clocks, Ltd."

Erinoid, Ltd. (A. 740 & 759)
Among the articles exhibited will be "Erinoid," an artificial horn from casein; "Erinofort," a cellulose acetate material in moulding powder, sheets and rods; "Erinoplas," a cast resin material in rods and shapes; and "Erinol," a varnish for waterproofing and insulating.

A. E. Foster (F. 1416)
Wooden floor standard lamps will be a feature of this stand.

Franklin Lamp Mfg. Co., Ltd (F. 1343)
Articles on view will consist of lamp-shades of pressed oil paper, pleated compositions, silk and cotton materials, reflector table lamps and pottery, crystal and alabaster; also reflector wall bracket lamps and floor standards.

Garrard Clocks, Ltd. (D. 1135)
This stand will include electric clocks in a large variety of cases, and the company is also prepared to make up cases to customer's own designs. A device is available to enable the clock to be started from the front.

General Chemical & Pharmaceutical Co., Ltd. (A. 671)
Among chemicals of industrial interest the company is showing examples of "Oasis" accumulator acid, distilled water and potash electrolyte for use in nickel-iron batteries.

General Post Office (Earls Court 218)
A continuous stream of letters will be seen passing through a transparent letter box around which is revolving a mail van. The moving effects are electrically controlled. The background of the display is symbolic of the various vehicles for transportation of mails.

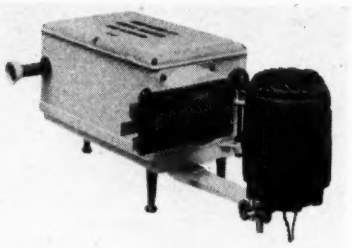
Glazart, Ltd. (F. 1423)
Lamp shades in period and modern styles will include a selection of hand-painted models, some decorated with sporting birds. For the first time the company is showing floor and table standards, including "Snow White" shades (illus. p. 243) for nurseries.

Grimshaw, Baxter & J. J. Elliott, Ltd. (D. 1139)
All kinds of electric clocks will be on view.

Hanovia, Ltd. (A. 682)
Among electro-medical products will be ultra-violet ray and infra-red lamps, including the "Centrosol," "Kromayer," "Sollux," "Homesun" and fluorescent analytic lamps.

O. C. Hawkes, Ltd. (Earls Court 553)
See description of exhibits at Birmingham.

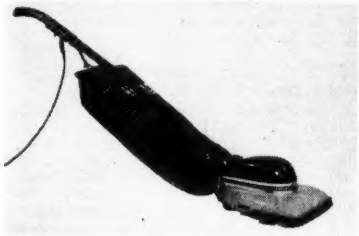
Adam Hilger, Ltd. (A. 679)
Optical apparatus for use in works laboratories will include a "Donaldson" trichromatic colorimeter (illus.) suitable for checking the compliance with B.S. Specification of signalling glass for road, rail and aerodrome purposes. Two interesting applications of photo-electric cells will be seen in the non-recording microphotometer for quantitative spectrographic analysis and the



The "Donaldson" trichromatic colorimeter (Adam Hilger)

"Spekker" absorptiometer used for chemical analyses by measuring the colour produced in various reactions.

Hoover, Ltd. (H. 1665)
Working models of sectional exhibits will indicate the various functions of the Hoover cleaner. By a vibrating beam of light the agitation of a carpet as a cleaner passes over it will be demonstrated, while a stroboscope will show the beating action in slow motion. An



A Hoover cleaner

interesting comparison with the latest cleaners will be afforded by an exhibit of early patented machines for the mechanical cleaning of carpets.

F. A. Hughes & Co., Ltd. (A. 760 & 775)
Among materials used extensively for the production of all types of plastic articles will be "Rockite" thermo-setting

The Post Office exhibit

synthetic moulding compounds and a large range of powders for more highly specialised uses. Articles made from these will include radio cabinets, meter cases, &c.

Other exhibits will be "Rockite" impregnating and laminating resins used for high-grade insulation; injection

A K.F.M. "Internalite" sign

mouldings such as coil bobbins, switch dollies, &c., made from "Cellomold"; and cables and wires insulated and sheathed with "Mipolam," a comparatively new thermoplastic resin of the polyvinyl chloride type.

Hyders, Ltd. (F. 1414)
Wrought-iron lighting fittings will be among the exhibits of this company.

Ideal Home Electrical Appliances, Ltd. (A. 700)
Equipment on this stand will comprise health massage appliances, medical appliances, ultra-violet-ray high frequency vitalators and ozonisers and radiant heat and light apparatus.

Imperial Chemical Industries, Ltd. (A. 627 & 640)
The policy introduced last year of showing one major product at a time is continued. Last year the subject was soda. This year it will be ammonia, which will be of interest to refrigeration engineers. Exhibits will fall into six main groups: the uses of ammonia in its anhydrous form; as ammonia liquor; as ammonium compounds; oxidised to nitric acid; converted to cyanide; and converted into urea.

Insulators, Ltd. (A. 761)
The stand will be devoted to mouldings in use in practically every sphere of the electrical, engineering, radio and domestic appliance industries. An array of large technical mouldings and switchboxes, formers, instrument cases, etc., will be accompanied by injection mouldings from automatic plant.

Jaffe & Rose (F. 1344)
Table lamps and figure lamps will form the basis of this exhibit.

Johnson, Matthey & Co., Ltd. (D. 1236 & 1240)
This stand has been planned with the idea of demonstrating the importance of the precious metals in every-day life. Contacts for electric organs, thermostats, switchgear and contactor gear will be shown, and a film will tell the story of manufacture of silverware from bar to finished product.

Kent Mouldings, Ltd. (A. 770)
Plastic mouldings for electrical purposes will be shown.

K.F.M. Engineering Co., Ltd. (D. 1131)
Especially suitable for directional purposes in cinemas and business premises, "Internalite" glass signs (illus.) have the lettering or motif etched in the glass (in colour if required) and illuminated by striplight metal filament lamps enclosed in a framework along one edge of the glass. The light is internally reflected except by the etched portion, which stands out sharply. The signs are obtainable in transparent form or double-sided.

Kitchendom, Ltd. (Earls Court 424)
Refrigerated kitchen cabinets will be included among the cabinets shown.

E. & J. Leek, Ltd. (F. 1232)
Figure lighting fittings will be a feature of this display.

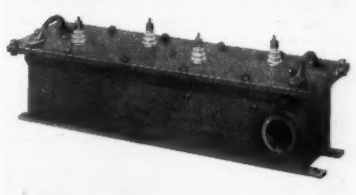
W. Lusty & Sons, Ltd. (F. 1365 and Earls Court 178)
Exhibits on this stand will include silk shade productions used in conjunction with "Brolus" art ware and a full range of floor standards in oak, mahogany, walnut, antique gold and ivory floor standards. In addition, new and exclusive finishes will be shown on table lamp bases.

Mallinson & Eckersley, Ltd. (G. 1533)
"Blackfriars Ware," in various woods, will include table and floor standards of unusual design.

Mayfair Shades, Ltd. (F. 1413)
A large range of lamp shades (illus.), table and floor lamps will be on view in various materials and finishes, all of new design. Modern electric lighting fittings will also be represented.

New Welbeck, Ltd. (H. 1656)
To the well-known "Master" cleaner with a square canister has been added a low-priced cylindrical cleaner known as the "Junior." Both are made by the B.T.H. Co. and the "Master" model is now available with a heating attachment for blowing hot air.

Ozonair, Ltd. (A. 660)
Apparatus will demonstrate the technical applications of ozone for bleaching, deodorising and other treatment of various chemical substances. Portable



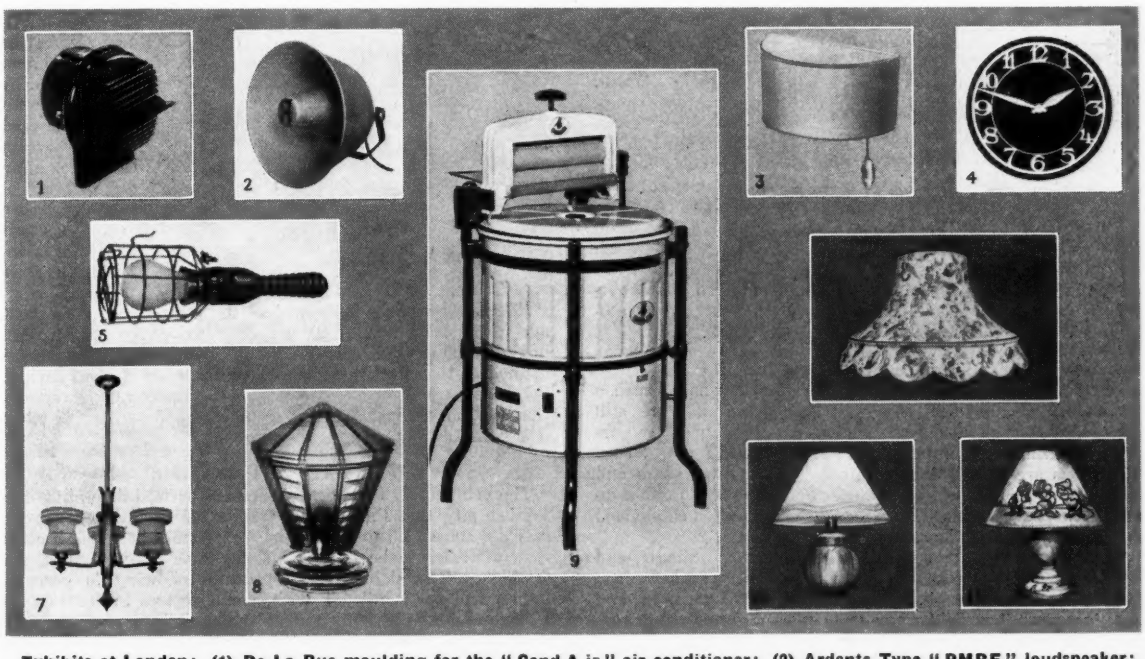
Ozonair Type "65" apparatus

ozone apparatus will also be shown for the treatment or alleviation of asthma and other complaints of the respiratory tracts. "Type 200" is specially designed for the treatment of suppurating wounds, sinuses, etc. The type "65" commercial apparatus (illus.) is designed to give large volumes of highly concentrated ozone from air or oxygen for use in chemical processes in which oxidation by ozone is required.

A. J. Pepper & Co., Ltd. (D. 1117)
Various novelties in the way of table standards and decorative lighting will include models with figures of skiers, golfers, ships, etc.

Perivale Clock Mfg. Co., Ltd. (D. 1127)
Synchronous electric clocks of all kinds will be on view.

Perry, Bevan & Co., Ltd. (E. 1219)
Electric lamps are among this company's products.



Exhibits at London: (1) De La Rue moulding for the "Cond-A ir" air conditioner; (2) Ardente Type "PMRE" loudspeaker; (3) Waite "Bexo" bedlight; (4) A Garrard clock; (5) Stadium handlamp; (6) Dernier & Hamlyn shade; (7) Walker Fender pendant; (8) A Webb glass fitting; (9) The "Goblin" popular washer (British Vacuum Cleaner Co.); (10) Shelley pottery table lamp; (11) Glazart table lamp

Reliance Rubber Co., Ltd. (A. 719)
Repetition mouldings of all kinds are made by this company.

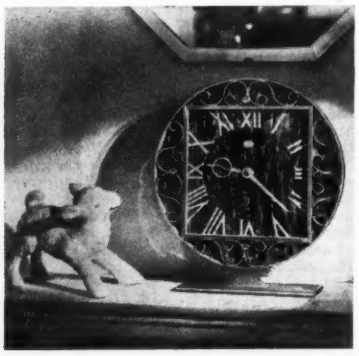
Philip Salter (F. 1420)
This exhibit will include a comprehensive selection of table lamps and pendant shades in a variety of parchment and washable non-inflammable and silk materials. A full display of chromium and wooden floor standards will also be on view.

Schick Dry Shaver (England), Ltd. (E. 1220)
This year the "Colonel" model shaver is being introduced for the first time, available for 110-120 and 200-250 AC or DC, with a white bakelite case and a modified motor.

Scottish Development Council (Earls Court 255)
See description of exhibits at Birmingham.

Shelley Potteries, Ltd (C. 1026 & 1049)
Pottery table lamps (illus. p. 243) are this company's speciality. A novelty is a teaset and table lamp, with china shade to match, several different designs being available.

Smith's English Clocks, Ltd. (D. 1141)
A new line is the "Velocraft" clock,



Smith's "Velocraft" clock

designed to harmonise with the soft furnishings of a room. It has a rich crushed velvet background to the characteristic decorative scroll work and a "Sectric" movement. A new low level in prices has been set by the "Sovereign," a mantel clock, and the production of style and reproduction clocks has been increased. Three new synchronous chimes and strikes are the "Rangoon," "Batavia," and "Bengal."

Stadium, Ltd. (G. 1541)
A low-priced inspection lamp (illus. p. 243) is supplied with a special grip clamp. The "Nearlite" is a small portable spot lamp, also fitted with a clamping arrangement. The company has a large range of torches for emergency use and two moulded table lamps.

W. F. Stanley & Co., Ltd. (A. 676)
Improved models of the "Fuller" calculator are made almost entirely of bakelite, with enlarged cylinders, combining lightness in weight with improved accuracy. The instrument is available with the indices made of synthetic glass. A new radial planimeter will measure circular diagrams spaced in square root proportion, while a new "Universal" planimeter and a new polar planimeter have increased ranges. The "Allbrit" planimeter has a glass graticule in place of the usual tracer point. An improved 5-inch tachometer is a further product.

Thermega, Ltd. (A. 702)
In addition to the standard appliances (blanket, heating pad, mat, foot muff, etc.) a new half-hoop heater (illus.) has been introduced for massage work. This is placed over the arm or leg and supplies warmth without pressure. A larger heater of the same type is used for placing over babies' cots in cases of premature birth.

Waite & Son, Ltd. (F. 1345)
"Bexo" shades (illus. p. 243) for which the firm holds the manufacturing rights in this country, are constructed without wire. The various portions of the cover are fastened together by rings or strips of plastic material, which, requiring no thonging or binding, gives a dainty finish to the shade.

Walker Fender Co., Ltd. (Earls Court 186)
Besides the latest designs in floor and table standards and pendants (illus. p 243) a feature will be made of indirect lighting units. Clocks are incorporated in many of the table standards and there are several novelty fittings.

Thos. Webb & Sons (A. 811)
Glass table lamps will include a design (illus. p. 243) of novel appearance.

P. Webber, Ltd. (F. 1397)
The company is showing all types of lampshades and bedlights in the latest materials, also wooden floor standards and table stands, chromium floor standards and table lamps, vases and figure lamps with shades of unusual design.

New "Thermega" half-hoop heater

The International Electrotechnical Vocabulary

By G. W. O. Howe, D.Sc., M.I.E.E.

THIS work* is published for the International Electrotechnical Commission by the Comité Electrotechnique Française. The definitions are given in French and English, but the names of the terms defined are also given in German, Italian, Spanish and Esperanto, although no reason is given for the introduction of the last named. The terms are indexed separately under the six languages, so that it is easy to look up a term in any of these languages, although the definitions are only given in two languages.

The origins of this work are traced back to a resolution passed at the St. Louis International Congress in 1904 which referred to the standardisation of nomenclature, but the truth of the introductory words "it will be remembered" is doubtful; the number of people who remember the wording of resolutions passed in 1904 must be vanishingly small.

A Difficult Task

The amount of work involved in the preparation of such a vocabulary is enormous; many of the definitions are still matters of discussion and the phenomenal growth of the subject is continually leading to the introduction of new terms. The terms are classified in 14 groups, such as machines and transformers, electric traction, electro-chemistry, radio-communications and electro-biology, and each group is subdivided into a number of sections.

The French definitions have been adopted as the basis, and the English wording has been made as nearly as possible a translation of the French. This accounts for "intensity" and not "strength" of field on page 1, and for "line equipotential," although the Esperanto has "egalpotencialaj linio," on page 2. We note on page 6 that "l'espace" is mistranslated "the medium"; space is a good English word and if medium had been intended the French would have used "milieu." Capacity and capacitance are used indiscriminately. The dielectric constant is defined as "the inverse of the physical constant which takes account of the influence of the medium in the expression for Coulomb's Law." Unless it is specified how this is to be done, the definition is so vague as to be useless; as usually written in this country Coulomb's Law contains the dielectric constant and not its inverse. Although defined as "dielectric constant" it is indexed under its French form "constant dielectric."

I cannot find "permittivity" in the index nor among the definitions. There is a serious omission in the definition of magnetic induction; it is stated that "it may be measured by the mechanical force exerted on an element of a circuit traversed by a current at a given point, or by the EMF induced in an elementary circuit surrounding the point." However great the magnetic induction may be, no EMF is induced in an elementary circuit surrounding the point. Self-inductance of a circuit is defined as "equal to the total magnetic flux linked by it, divided by the current that flows through it"; there is no suggestion here that the product of flux and turns is intended. The definition of mutual induction is even more misleading.

Effective reactance is defined as the component of the voltage in quadrature with the current, divided by the current, but nothing is said about its sign, whereas susceptance is defined as the effective reactance (*with reversed sign*) divided by the square of the impedance. It is necessary to specify that the effective reactance is to be regarded as positive when it is such as to cause a lagging current.

The English Translation

The printing was done in France and is well done, but it is a great pity that the English translation of the introduction was not submitted to an English proof reader. A publication that professes to be bilingual should not have "wich" for "which," "vocalabury," "esperanto following *to* german, italian and spanish," all with small letters in contrast to French and English which are given capitals.

In four places on page 124 "moyen" is mistranslated by the singular "mean," thus "Electric Alarm—a mean of giving a sound signal consisting of a vibrating hammer and bell of which the hammer is worked by an electric current" whereas "Electric bell—a mean of giving an acoustic signal consisting of a bell of which the hammer is worked at intervals by an electric current"; the principal distinction being apparently between the sound signal and the acoustic signal! It is incorrect to say that the object of the guard ring on insulators is to sub-divide the potential gradient more evenly; it is the potential and not its gradient which is sub-divided.

There are many definitions which are beyond reproach but the utility of which may be questioned, *e.g.*, "Underground line: an electric line buried in the ground"; "Warning circuit: a circuit used for giving warning"; "Electric heating:

* I.E.C., 28, Victoria Street, S.W.1. Pp. 311, price 10s.

the production of heat by electric phenomena "; "Tooth: a portion of the magnetic circuit made of iron and included between two consecutive slots."

It must be emphasised that no fault can be found with the majority of the terms and definitions, but those which we have adversely criticised show that the volume must be regarded as a first draft which must undergo careful revision at the hands of experts in the various branches. When the experts have done their best there is the danger of an editor making a mess of things. In the final draft of the British Standard Glossary (1936), for example, "susceptibility" was given and correctly defined, but at the eleventh hour somebody who knew that "capacity" had been replaced by "capacitance" altered it to "susceptance," and so it appears in the published volume. Both of these terms are correctly defined in the volume under review.

The Institution Dinner

Record attendance

THE annual dinner of the Institution of Electrical Engineers was held at Grosvenor House, Park Lane, on Thursday, February 9th. Dr. A. P. M. Fleming presided over a record gathering of nearly twelve hundred.

The speeches, mainly in serious vein, were naturally influenced by the present concern for National Defence and Sir John Anderson (Lord Privy Seal), in proposing the health of the Institution, referred particularly to the importance of the electrical engineer in a time of emergency and to the necessity of ensuring that those engaged in essential work should remain in their jobs and not be called away to other tasks, at least until they were satisfied that they could be spared. It would be time enough for them to volunteer if they found their occupations could be filled by others. In the meantime, he hoped they would not neglect other part-time national service where such service would not interfere with their regular occupations. He paid a tribute to the work of the President of the Institution in assisting in organising the electrical resources of the country, and emphasised the importance of supply undertakings and manufacturers co-operating in the task of arranging for reserves of equipment.

The President, Dr. Fleming, in his response mentioned that the Institution was working closely with the Ministry of Labour in the preparation of a register to classify the knowledge and experience of members. He asked that in our concern for National Defence we should not lessen our efforts to compete in the export market. He paid a special tribute to the value of the technical press to the industry.

Mr. H. T. Young (Past-President), in proposing the toast of the guests, responded to by the Earl of Dudley and Professor W. L. Bragg, asked that in this toast should be remembered particularly all those secretaries and others who worked so hard in the interests of the many sections of the Institution. The Earl of Dudley, who explained that his title to be a guest was because he was president of the Iron and Steel Institution, referred to the coal industry and thought that if the electrical industry complained that coal prices were going up, they should remember that this was due to some extent to the loss of domestic coal sales brought about by the extension of domestic uses of electricity. The desire of research laboratories to serve industry was stressed by Professor Bragg.

At the conclusion of the speeches the usual reunion of members and guests continued to a late hour.

Left to right: 1. Messrs. H. Warren, T. H. Boyd, Dr. L. F. Morehouse and Mr. G. W. Gilman. 2. Messrs. P. V. Hunter, H. C. Lamb and H. T. Young. 3. Sir John Anderson and Sir George Lee. 4. Messrs. A. D. Maclean, C. Kerr, Col. H. S. Briggs and Mr. E. C. Cayley. 5. Messrs. K. Fraser, K. P. Symes and P. D. Bussell. 6. Sir Cyril Hurcomb and Dr. A. P. M. Fleming. *[Elec. Rev. photos.*

Motors Filled with Inert Gas

REFERENCE to the first two motors of the totally enclosed type filled with inert gas to be built is made in the American *General Electric Review*. They were constructed for oil-refinery service and are rated at 1,000 HP at 3,000 RPM. A closed-circuit system of ventilation includes surface-air coolers and a valve for continuously injecting a small amount of inert gas slightly above atmospheric pressure. This system of ventilation is unusual for high-speed induction motors; it is maintained by propeller fans which force the inert gas over the motor windings through ducts and then through surface coolers. A forced lubrication system creates an oil seal at the bearings by means of two continuously operating pumps. Mention is also made of extended use of fibre-glass tape for former-wound coils of motors requiring Class B insulation exposed to high temperatures. Its main advantages are saving in space and improved dielectric strength. The largest motors so constructed are inductor machines of 2,000 to 2,500 HP, 3,000 V, running at 200 RPM.

The E.R.A. Luncheon

Dependence of electrical industry on research

ON Friday last the annual luncheon of the British Electrical and Allied Industries Research Association was held at the Savoy Hotel, London. Prior to the luncheon the Association's annual general meeting took place, with Mr. A. E. Tanner, chairman of the Council, presiding. The proceedings were quite formal, commencing with a vote of thanks to the retiring president. In acknowledging it Dr. C. C. Paterson remarked that the office caused no anxiety to-day when it was supported so well by the Council and so thoroughly by the industry.

Mr. A. E. Tanner then moved the adoption of the accounts and annual report, briefly mentioning some of the numerous researches now proceeding (to which reference was made last week).

Mr. J. K. Brydges (Eastbourne) said he was interested in cookers and inquired whether any research had been done into boiling plates.

Mr. E. B. Wedmore (director and secretary) replied to the effect that some time ago methods of testing boiling plates had been looked into, but so many manufacturers were concerned that no one common problem could be found for reference to E.R.A. for solution.

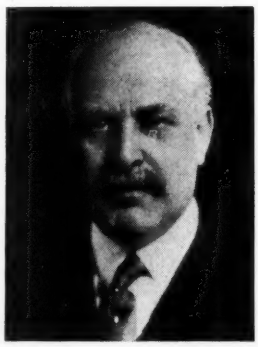
Col. Sir T. F. Purves, Capt. J. M. Donaldson and Messrs. R. Lee, C. G. Morley New and W. B. Woodhouse were re-elected to the Council, while Mr. J. W. J. Townley was newly elected. Sir Leonard Pearce, Mr. V. A. Pask and Mr. A. P. MacAlister have retired from the Council.

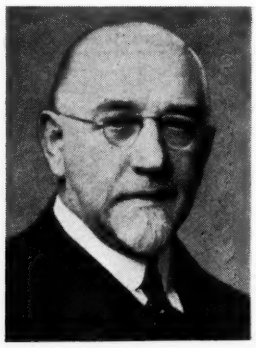
There was a large attendance at the luncheon, at which the new president, Lord Stamp of Shortlands, took the chair. Following the loyal toast, "The E.R.A." was proposed by Dr. A. P. M. Fleming (President, I.E.E.), who recalled how a B.E.A.M.A.-I.E.E. Committee had become the Council of E.R.A. As one of the members of that original Committee it gave him particular pleasure to testify to what the Association had done and become. One of its greatest achievements, which justified it, was the inducement of competitors to throw their experience into the common pool for the solving of common problems, with far-reaching effects on the industry. Mr. E. B. Wedmore was backed by a staff in the selection of which he had shown great wisdom, for many of them not only had experience of industry but they also realised the needs of industry.

Lord Stamp, responding, denied that he had any claim to the presidency by reason of expert knowledge, but said he had many contacts with what E.R.A. represented. Railway research was connected with a remarkable number of E.R.A. Committees; for example, glass insulators were being very closely studied, but they had not so far been found to be materially better than standard types.

The electrical industry naturally took a leading place in research because it had no real industrial or commercial history apart from the history of research and invention. Most industries grew out of, and often clung to, primitive operations on raw materials to supply age-old needs; scientific research was added to them, complicated them, disturbed them and by many was thought to be of doubtful advantage if it could not be confined to benefit those who promoted it, but merely made competition more keen and created unnecessary obsolescence of plant.

The whole genesis of the electrical industry was different,





Lord Stamp, the new president of E.R.A., and Mr. A. E. Tanner, chairman of the Council

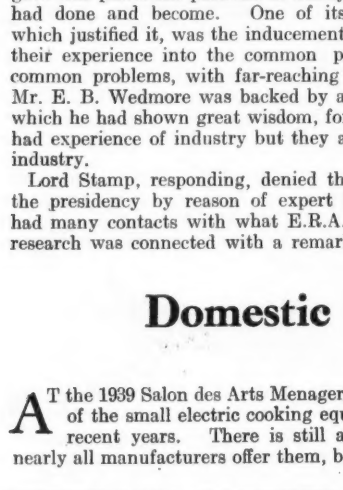
for it had been born out of research and was meeting created needs of an advanced civilisation. Continuance of research was its sustenance, and it was not afraid of it. Application of funds ought not to be cramped as it was by those who feared to spend because they could not see an immediate return. The work of E.R.A. was a good example of economics, for both producers and users co-operated in pooling their ideas so that both obtained full value. With generalised research there should be a modest profit for all. It was an insurance against being left behind by someone else's luck in discovery.

Mr. A. E. Tanner proposed the president's health.

Domestic Electrical Apparatus in France

Novelties at a Paris exhibition

AT the 1939 Salon des Arts Menagers in Paris there were few of the small electric cooking equipments so noticeable in recent years. There is still a demand for these, and nearly all manufacturers offer them, but an effort is apparently being made to popularise the larger sizes, and the type most numerous at the exhibition comprised an oven and three hot-plates.



"Perlia" device for grilling meat on a plate

Nearly all makers have raised up their hot-plates from the body of the stove and rendered them removable by a system of plug and jack terminals. Space is allowed underneath to permit spilled food to be cleaned out easily. Although this may rob the models of some of the smartness of line it adds a great deal to convenience.

The sizes of the hot-plates have been practically standardised. One is generally 220 mm. in diameter with a loading of 1,800 W; a second is 180 mm. dia. and rated at between about 1,200 and 1,500 W; and the third is 145 mm. dia. and rated at 750 to 1,000 W. Alsthom use their "Calrods" in one or more of the positions.

Among irons the only novelty to French people was an H.M.V. model with a streamlined hood which gives it an unusually modern appearance.

Among the distinctly novel ideas to be seen was a grill by Perlia which has a handle sufficiently large that it can be used to support the grill like a base. The grill is allowed to heat for three or four minutes, and is then placed on top of the meat to be cooked. The meat is left in a plate so that the grill can be prepared at table and without any loss of juice.

Power for an interesting new coffee mill is provided by a 1/20th HP universal motor which is held in place on the mill by two thumbscrews so that it can be removed without difficulty. The advantage of this is that the same motor can be fixed to an egg-beater which is also sold with the necessary connections for the motor. S.E.V., who are bringing out this novelty, explain that if this proves to be a success they intend to market a whole series of apparatus for operation by the same motor, such as knife sharpeners, lemon squeezers, &c.

Electrical Engineers' Ball

IN accordance with custom the date selected for the Electrical Engineers' Ball was February 10th, the evening following the I.E.E. dinner. Last week's function proved to be as great a success as any of its immediate predecessors, with a liberal supply of novelty souvenirs for the ladies distributed during the supper interval. There was an unusually early and keen demand for tickets this year, 1,150 having been sold, which compares with an attendance of about 700 eight years ago, when the venue was changed to Grosvenor House, Park Lane, consequent upon the closing of the Hotel Cecil. The proceeds of the Ball will go to the I.E.E. Benevolent Fund.

Meetings and Discussions

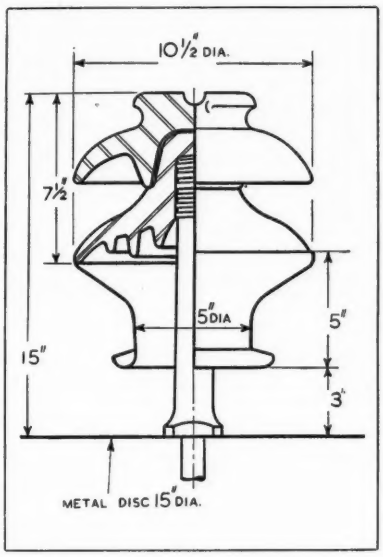
Insulator Performance
Parallel Operation Problems
Joints in Steam Piping

Investigations carried out at the Queen Mary College were described in a paper on the testing of overhead-line insulators under deposit conditions which was presented at last night's I.E.E. meeting in London, and a special type of high-voltage insulator embodying protection against industrial saline deposits was described. In a paper submitted to the Chester and North Wales Branch of the E.P.E.A. last week the opinion was expressed that supply frequency in this country could be maintained with an accuracy never before achieved, but only by the carefully considered application of precise automatic or semi-automatic regulation

Overhead-line Insulators

THE testing of overhead-line insulators under deposit conditions was dealt with in a paper submitted to the Transmission Section of the INSTITUTION OF ELECTRICAL ENGINEERS in London on February 15th by Prof. W. J. John (Queen Mary College, University of London), in whose extra-high-voltage laboratory the work described was carried out, and Dr. C. H. W. Clark (Steatite and Porcelain Products, Ltd.), who held the I.E.E. Ferranti scholarship at the time the investigations were conducted.

The paper commenced by discussing the production in the laboratory of wind and salt spray, and compared natural and artificial dew formation. Means of judging the severity of dew and deposit formations were described and standard tests outlined. An account was given of various types of insulators tested and their behaviours, magnitude of leakage current being accepted as the best criterion.



33-kV concentric-cylinder pin insulator

The conclusions drawn from the first part of the paper were that the tests had confirmed the dependence of performance on the surface resistance of the insulator. The effects of such other factors as shape and size were also made apparent, however. For example, a deeply overhung upper shed and a deep recess round the pin improved performance in horizontal wind; and in general larger size bettered performance in over-voltage tests, while four sheds would probably tend to induce better voltage distribution under deposit conditions than three sheds. Therefore laboratory technique as devised by the authors could be utilised to compare the performances of insulators under salt-deposit conditions.

Further work was being carried out under the auspices of E.R.A. with a closed-circuit wind tunnel producing velocities up to 70 m.p.h. The high voltage was applied by a 33-kV single-phase power transformer having a full load output of 1.6 A, so enabling heavy leakage currents to be sustained without appreciable voltage drop. The technique for artificial dew-formation was being further investigated, and measurements were being made of the degree of radio interference caused by various insulator types while undergoing deposit tests.

Protection Against Deposits

The second part of the paper was devoted to the design of high-voltage insulators embodying protection against industrial saline deposits, particularly when installed near the sea coast. The basic principle for both pin and cap-and-pin types was almost complete enclosure of the under-surface of the lower shed by attaching to the latter a long metal cylinder concentric with the supporting pin. Thus, solid matter carried in suspension in the outside air could not easily enter. Should the unprotected external part of the insulator fail completely due to a deposit on it, then full line voltage would be applied to the metal cylinder, but this was insulated from earth by the internal protected surface and by the air space between it and the pin (as illustrated). An additional precaution against penetration of wind blown upward was a disc attached to the pin above the cross-arm at the bottom of the insulator. Thus deposit could not enter the cylinder, whatever the inclination of insulator and angle of wind might be. The maximum height to which deposit could be carried was 1.5 in. so that the cylinder could be effective if only 2 in. long. Most severe salt deposit tests failed to cause any discharges that could either be seen or recorded by a cathode-ray oscillograph.

The third part of the paper was concerned with an inquiry into the formation of industrial deposits under natural conditions. A special form of recorder was described for measuring leakage current variations due to changes in weather. This consisted of a multi-element milliammeter, having eight small neon lamps with electrodes consisting of discs inside circular loops. They were enclosed at one end of an optical box with a moving photographic film at the other end. Each lamp was connected with one insulator string under observation and shunted with 500,000 ohms, so enabling the lamps to glow brightly enough to affect the photographic film when the leakage exceeded 0.5 mA.

Comparison of Types

Of the comparisons made of different types of insulators as judged by various criteria, the most definite was that based on the magnitude of the leakage-current surges during fog. This indicated that the performance of normal insulators was worse than that of the anti-deposit types. Comparisons based on the appearance of the deposit, the wave-form of the leakage current, and the magnitude of discharges seen on the insulators, although less definite, were in general agreement with the above classification.

In bad weather both surface sparks and arcs usually started from the pins and spread outwards over the under-surface of the porcelain. Small sparks were also sometimes seen on the surfaces of the cylindrical porcelain parts and starting from the bottom edges of the caps of all types, except those which had their caps embedded in porcelain.

The tests described in this part of the paper were necessarily slow, as they depended on weather conditions. They were not brought to a conclusion, but the technique had been developed, the necessary apparatus installed, and a prolonged test now being undertaken was to extend over several years.

Frequency Regulation and Load Sharing

AN attempt to show how the regulation of frequency, which was intimately bound up with load sharing between generators and power stations, had an important bearing on cost of generation was made in a paper by Mr. T. B. Somerville which was read before the Chester and North Wales Branch of the ELECTRICAL POWER ENGINEERS' ASSOCIATION at Llandudno on February 11th.

The general principles involved were outlined with the aid of a multiple water tank analogy, the author declaring that frequency variations on large systems were greater now than they were prior to interconnection. Coarser turbine governing had therefore found favour for parallel operation to secure increased stability of load sharing.

The degree of load change and adjustment of governer settings required for correction of frequency disturbance was indicated by the statement that in one grid area of present dimensions the station responsible for frequency regulation would have to undertake load adjustment of the order of 20,000 kW to correct a frequency error of 0.1 cycle. An experiment in America had demonstrated that normal frequency could be maintained with a high degree of accuracy on one system by automatic regulation in one station only, but the load changes involved would be of the order of 100,000 kW in ten minutes, the total system load at the time being about 5,000,000 kW.

The author expressed his firm conviction that the capabilities of the existing generating plant and interconnectors in this country were such as to render them adequate to maintain the supply frequency with an accuracy that had hitherto never been achieved but that such accuracy could be obtained only by the carefully considered application of precise automatic or semi-automatic regulation.

Examples of devices available for this purpose were briefly outlined with the aid of schematic diagrams, mostly of the dual impulsing type, one element being a timing clock and the other rotating proportionally to the load. The author suggested that a well considered scheme of auto-control should apply to the boiler house as well as the turbine governors,

favouring Ward-Leonard control of DC auxiliaries, each station being allotted a share of the onus of frequency regulation.

Steam Pipe Joints

MOST of the principal types of joints employed for steam piping were reviewed and illustrated in a paper by Messrs. F. J. Cowlin and J. P. Chittenden (the preparation of which was facilitated by the English Electric Co., Ltd.) which was presented to the INSTITUTE OF MARINE ENGINEERS in London on February 14th.

The authors pointed out that much attention had been devoted in recent years to the design of flanges, but the various investigations presupposed a knowledge of the bolt loading required and their value was limited insofar as this could or could not be determined with reasonable accuracy.

The materials and design of high-temperature bolts and nuts, the best type of thread to use, the method of tightening, the treatment to prevent seizing were all of great importance, since the results of experience did not invariably bear out the results of laboratory tests. At temperatures above 800 deg. F. the effects of creep became of paramount importance, not only as affecting the design of bolts and flanges, but also because of the effect of the gasket conditions.

There appeared little reason to doubt that for these conditions the welded type of joint would replace the bolted type wherever considerations of accessibility and renewability permitted, but this in turn introduced an entirely new set of problems, the principal one being that no really satisfactory test of the reliability of the weld had yet been evolved. Numerous methods had been investigated, including mechanical, magnetic, electrical, and X-ray tests, the last two giving perhaps the most promising results and being the two most commonly used. The principal safeguard appeared still to rest in the skill of the operator combined with rigid control of the welding technique and stress relief by heat treatment after completion.

Whatever type of joint was selected, whether bolted, seal-welded or solid-welded, its successful application involved the solution of peculiarly perplexing problems by those responsible for the design, but it was the practical engineer with whom finally rested the success or failure of any type of joint.

FORTHCOMING EVENTS

Institution of Electrical Engineers.—Thursday, February 23rd. Institution, London, W.C.2. 6 p.m. "The Metadyne and its Application to Electric Traction," by Messrs. G. H. Fletcher and A. Tustin.

Informal Meeting.—Monday, February 20th. Institution, London, W.C.2. 7 p.m. Discussion on "The Steam Cycle," to be opened by Mr. E. L. Luly.

Scottish Centre.—Friday, February 17th. Royal Technical College, Glasgow. "The Long-distance Telephone Call," by Capt. B. S. Cohen.

Mersey and North Wales (Liverpool) Centre.—Tuesday, February 21st. Technical Institute, Grosvenor Museum, Chester. 7.30 p.m. "Testing of Transmission Line Insulators under Deposit Conditions," by Prof. W. J. John and Dr. C. H. W. Clark. (Joint meeting with the Chester Engineering Society.)

Northern Ireland Sub-Centre.—Tuesday, February 21st. 9, Wellington Place, Belfast. 6.30 p.m. "The London Television Service," by Messrs. T. C. Macnamara and D. C. Birkinshaw.

Hampshire Sub-Centre.—Thursday, February 23rd. Southampton. Annual conversazione and dance.

West Wales (Swansea) Sub-Centre.—Thursday, February 23rd. Technical College, Mount Pleasant, Swansea. 6.30 p.m. "Electricity in Coal Mines," by Mr. R. Nelson.

Devon and Cornwall Sub-Centre.—Friday, February 24th. Plymouth. Annual dinner and dance.

Junior Institution of Engineers.—Friday, February 24th. Annual dinner.

Finsbury Technical College, Old Students' Association.—Saturday, February 18th. Trocadero Restaurant, London, W.1. 6.30 for 7 p.m. Annual dinner.

Association of Supervising Electrical Engineers.—Tuesday, February 21st. 2, Savoy Hill, London, W.C.2. 7.15 p.m. "The I.E.E. Regulations for the Electrical Equipment of Buildings," by Mr. A. Kirk.

Saturday, February 25th. Trocadero Restaurant, London, W.1. 6.30 for 7 p.m. Annual dinner and re-union.

Leeds Branch.—Tuesday, February 21st. Griffin Hotel, Boar Lane, Leeds, 1. 7.30 p.m. "The Factories Act, 1937," by Mr. S. J. Emerson.

Paisley Association of Electrical Engineers.—Tuesday, February 21st. 39, High Street, Paisley. 7.15 p.m. "Power Station Practice," by a representative of Met.-Vick. Elecl. Co.

Electrical Power Engineers' Association.—Tuesday, February 21st. North-Met. Elec. Supply Co. Theatre, Wood Green. "Television," by Mr. A. H. Bennett.

Belfast Association of Engineers.—Wednesday, February 22nd. Municipal College of Technology, Belfast. "The Galloway Hydro-Electric Scheme," by Mr. J. K. Hunter.

Physical Society.—Friday, February 24th. Imperial College of Science and Technology, London, S.W.7. 5.15 p.m. Short papers.

New Type of H.R.C. Fuse

A NEW current-limiting power fuse, the action of which is based upon reduction in the magnitude of the arc currents, is described by Messrs. D. C. Prince and E. A. Williams in *Electrical Engineering* (the journal of the American I.E.E.). The main element consists of pure silver wires wound on a seramic core and welded at each end to copper strips which are in turn welded to the terminal ferrules. The space between the core and the Pyrex glass tube in which the assembly is sealed is filled with granular quartz. The latter is prevented from coming in contact with a short length of the centre of the silver wires by a number of ceramic thermal chambers. A target wire welded to the upper connection strip passes down the centre of the core to a chamber at the bottom containing a gas-producing chemical. Below the chemical chamber is a thin copper target which is curved inwardly, until the blowing of the fuse causes it to reverse its curvature. When the silver wires volatilise, the metal vapour expands to 400 times the original volume of the wires, and is thrown out of the arc path to be condensed on the quartz granules. The arc is thereby confined to the small space previously occupied by the silver wires and most of its energy is dissipated in the heat transfer to the granules. The effect of the sudden removal of the vapour from the arc path is to insert a high resistance into the circuit at the instant that the wires melt. No high-pressure gas has to be dissipated and operation is silent. A typical case is cited in which the RMS asymmetrical current available (in the absence of the fuse) is 60,000 A. The silver wires volatilise at 2,000 A and the current decreases to an appreciably lower figure, enough resistance being inserted to produce approximately unity power factor, tending to cause final interruption at normal zero of both voltage and current. The fuse has been tested at from 2.5 to 23 kV.

Early Experimental Telegraph "Cable"

THE illustration below shows a sample of the "cable" installed in 1851 for the experimental telegraph between Alipore and Diamond Harbour, India, which was recently sent to Henley's Telegraph Works Co., Ltd., by Mr. C. R. Bland, the company's manager in India, who obtained it from Mr. Hewling Luson, secretary of the Bengal Telephone Corporation. The cable was installed by a Dr. O'Shaughnessy (later Sir William O'Shaughnessy Brooke, F.R.S.), the director of the East India Company's telegraphs, who had made a

Sample of experimental telegraph "cable" laid in India in 1851

series of experiments across the River Hooghly in 1838. It consisted of an iron rod ⅜ in. in diameter made up from separate lengths of 13 ft. 6 in. welded together. The rod was coated hot with two spirally applied layers of Madras cloth saturated with melted pitch with an admixture of tar so as to form a flexible coating when cool. To protect the rod still further, chiefly from mechanical injury, it was finally laid in a row of roofing tiles, half filled with a melted mixture of three parts by weight of dry sand and one part of resin, and when laid the whole of the space was filled up with the same melted mixture.

Steel Traction Poles

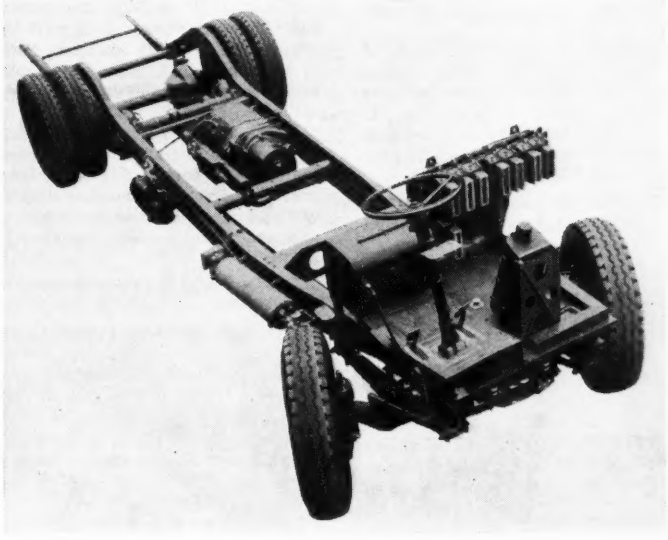
BRITISH Standard Specification No. 8 for steel tubular traction poles has just been revised, the object being to include poles of increased lengths for trolley-bus systems. Full details regarding dimensions and tests for each class of pole are given, and a scheme of marking has for the first time been introduced, whereby the length and class of each pole may readily be distinguished. Copies of this British Standard No. 469 may be obtained from the British Standards Institution, Publications Department, 28, Victoria Street, S.W.1 price 2s. each, or 2s. 2d. post free.

New Trolley-buses at Reading

Special design for low bridges

AS a result of representations by the Society of Motor Manufacturers and Traders to the Ministry of Transport, revised regulations have been made to apply to trolley-bus undertakings faced with obstructions from low bridges. Reading Corporation, at the instance of which the point was raised, is the first to take advantage of the concessions in the design of twenty-five two-axle double-deck trolley-buses now in course of delivery.

Under the existing regulations a safety "tunnel" having a ground-clearance of 10 in. is required for a distance of 14 ft. 6 in. from the front of the vehicle for two-axle chassis. This would have meant, in order to maintain a transmission giving a minimum variation from the straight line drive, placing the motor amidships high up in the chassis frame and employing a long, high-speed propeller shaft. The frame height of the trolley-bus chassis is practically the same as that for the oil-engined bus, but a height for the lower saloon floor of less than 2 ft. 8 in. would have been obtainable because of a $6\frac{5}{16}$ in. projection of the motor above the top of the frame. This, in turn, would have led to an increase in the overall height of the vehicle.



Plan view of chassis of Reading trolley-bus

The modification in the regulations allows of a reduction in the tunnel length to 12 ft. 6 in., and as a result the A.E.C. and English Electric Co., Ltd., have constructed vehicles on which the motor has been removed rearwards and placed lower in the chassis, giving lower floor height and enabling a conventional straight upper saloon to be used with an overall height over the trolley-buses of 15 ft. 1 in. The alternative would have been to place four seats abreast on the top deck with a sunken off-side gangway or to locate the motor in front of the vehicle with a long transmission shaft. For a two-axle chassis the twin tyres necessitate a narrow frame and a gangway that is clear of obstruction without having a bulged frame member. This is of special importance in the present design because with the lowered motor, the floor height is determined by the axle casing which is kept clear of the gangway by means of an oblique worm gear. The motor is inclined at an angle of 30 deg. to line up with the worm, which is offset to the near side clear of the gangway. The special $8\frac{1}{2}$-in. centre worm gear is also skewed at the same angle, permitting a straight-line drive under average load.

By combining the reservoir and control unit, the air-brake equipment is reduced to two compact components, the other being the motor compressor, thus minimising risk of leakage. One connection with the reservoir serves all brake cylinders. Independent adjusters are fitted to camshaft levers, and a high-lift cam enables one packing piece to last for the whole life of the $\frac{3}{4}$-in. liners.

The Reading trolley-buses embody the most recent developments of the Associated Electrical Equipment Co., and include servo-dynamic control, 24-28 V battery manœuvring, and a 1,600-W direct-driven dynamo incorporated with the main 80-h.p. motor. They were designed in accordance with specifications prepared by Mr. J. M. Calder, manager and engineer of the Reading Transport Department.

Parliamentary News (BY OUR SPECIAL REPORTER)

Safety in Mines

ON February 7th Mr. Ellis Smith asked the Secretary for Mines if he had given consideration to the recommendation made on page 367 of the Report of the Royal Commission on Safety in Coal Mines in which it was stated that the electricity regulations had been in their present form since 1913; that a detailed examination of the regulations should be made by electrical engineers; and that a committee should be set up to conduct the examination as soon as possible. He asked when the Secretary for Mines intended to appoint a Committee; and who were to be invited to serve on it.

Captain Crookshank said that he was taking steps to implement this recommendation at an early date, and if the hon. member would repeat his question in a fortnight's time he hoped to be in a position to give him the names of the members of the Committee and its terms of reference.

Hospital Emergency Equipment

On February 9th Mr. Perkins asked the Minister of Health whether it was his intention to make the requisite funds available for the provision of essential standby electrical plants for hospitals and other essential institutions.

Mr. Elliot said he assumed that his hon. friend was alluding to standby plants required for use in the event of failure of the normal supply in time of war. In so far as equipment of this kind was of no substantial peace-time use to the institution, a contributon to the cost might be made by the Exchequer, but he was advised that normally provision should be made against the possibility of breakdown in peace time, and therefore the question of a grant would not arise.

Mr. Emery asked the Minister of Health if, in view of the recent breakdowns of electric power stations causing inconvenience and danger to life in hospitals, he would state what steps, if any, he proposed to take to see that emergency lighting sets were provided in all such buildings.

Mr. Elliot said that he was not aware of the existence of circumstances which called for any action on his part, but if his hon. friend had any particular cases in mind, perhaps he would communicate with him and he would have inquiry made.

A Scottish Petition

Sir Murdoch Macdonald asked permission to present a petition from the citizens of Inverness appealing for power from the Electricity Commissioners to enable the burgh to purchase the additional plant necessary for the extension of its electricity undertaking and seeking assurance that any legislation introduced by the present Government would not give any privately controlled corporation powers to acquire the undertaking compulsorily in view of certain facts.

Leave was granted and the petition was presented.

Underground Telephone Lines

On February 13th Colonel Burton asked the Postmaster-General whether his attention had been drawn to the great number of telephone and telegraph lines which were put out of order during the recent storms through the breaking of overhead lines and collapse of poles under the weight of snow and wind; and whether he could state the estimated cost of placing these underground, and the number of men to whom it would give employment.

Sir W. Womersley, Assistant Postmaster-General, said that he was aware of the circumstances. It was the policy of the Post Office to provide telephone service by underground wires in preference to overhead wires wherever financial considerations admitted and about 13 million miles or rather more than 90 per cent. of the total mileage of telephone wire was already in underground cables. A very extensive survey would be necessary in order to ascertain the precise cost of placing the remaining wires underground and the number of men who would be employed, but it was clear that the cost would amount to many millions of pounds and would be prohibitive.

CORRESPONDENCE

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

Artificial Lighting

THE excellent and well-informed article by Mr. Downer will, no doubt, read as rank heresy to those who have studied the scale of lighting intensities recommended in some quarters. Nevertheless, the suggested scales in some cases are three times those recommended ten years ago, yet our eyes have not changed.

Mr. Watts suggests that daylight runs into "thousands of foot-candles." On the table where this letter is being written by diffused daylight from a north window I have at this moment an illumination meter reading 4 ft.-candles. It may be that the "thousands" may be registered in direct sunlight, but the sensible person draws his blinds or wears sunglasses when reading or writing under those conditions.

I agree that the scales of recommended illumination intensities are in general far too high, and I am surprised that nobody has had the courage to query them before.

February 13th. CONSULTANT.

Interesting as Mr. Downer's article in your issue of February 3rd is, on some of the well-known aspects of artificial lighting, many will, I fear, find it difficult to share a point of view which seems to suggest that the subject has, hitherto, been treated and developed by something approaching the ostrich mentality.

With an ever-widening diversity of purpose to which lighting is applied, considered along with the varying degrees of human eyesight, it seems a little futile to discuss the subject at all in terms of "average conditions." Your contributor in his article, as well as Mr. Grafton Watts in his letter in your current issue, has correctly reminded us that daylight of high, if varying, intensity is the natural condition by which we have grown through the ages to measure the efficiency of our sight. Isn't it rather due to the wide range of the human element and the varying physical qualities of artificial lighting that the difficulty arises in meeting your contributor's "average conditions" with the low intensities which he advocates?

Mr. Downer appears to deplore the increasing use of glasses as an aid to our deteriorating eyesight, which does seem to imply a contradiction if his theory that artificial lighting intensities (which are so far below those of daylight) are sufficiently high. It will, I think, be generally conceded that, given good diffusion and distribution, those intensities in the main could be many times multiplied with desirable results to both user and supplier alike, always granted that each individual case is treated intelligently on its merits. P. O. W.

February 12th.

Few will agree with Mr. Downer's views on illumination intensities, published in your issue of February 3rd, though his insistence on the advantages of diffused and indirect lighting deserves all possible support. After reading his article we are left in some doubt as to whether a low intensity of artificial lighting is desirable because the nature of the light is positively harmful to the eyes (even indirect lighting) and therefore the less we have the better, or because its revealing powers are such that 4 or 5 ft.-candles by this means provide equivalent seeing conditions to sunlight of the usual order of 1,000 to 10,000 ft.-candles.

On what grounds does the author state that intensities of 10 or more ft.-candles are obviously unnecessary and that illumination of only one-thousandth sunlight intensity is dangerously excessive What investigation can he quote in support of his assumption that "we should probably find 1 ft.-candle enough for nearly all purposes"? Every lighting investigation that has ever been carried out has indicated that higher intensities mean improved comfort, health and efficiency; if the reverse could be proved, lighting engineers would be the first to bow their heads and submit. But with so much overwhelming evidence in support of high intensities properly applied why should Mr. Downer, a well-known lighting man, wish to plunge us back into the dark ages from which we are slowly, painfully, but surely emerging?

The world is a better place because of electric light, and as lighting intensities keep going up so are our winter evenings becoming more bearable and the lot of the factory employee more happy. If any doubts remain as to the efficiency of higher intensities, try these things out yourself:—(a) Read a book for two hours with 4 ft.-candles and try again with 20 ft.-candles; (b) try fine needlework with 4 ft.-candles; (c) try both the above at dusk when daylight has fallen to 4 ft.-candles; (d) ask yourself whether you would like to live in perpetual dusk.

We are told that our ancestors worked by candle-light and worked very well without glasses. That statement means only that our ancestors were fine craftsmen who were denied any means of realising the parlous condition of their eyes following such abuse. Is it good logic to say that the general standard of eyesight has deteriorated with the increasing use of artificial light? Surely it is more correct to ascribe this to the increase in the amount of work done under insufficient artificial light.

I feel that I am expressing the view of the overwhelming majority of illuminating engineers when I say that lighting of the highest quality is necessary not only for the elimination of shadow and undue contrasts but also to enable the use of the high intensities for which human eyes were evolved and under which, alone, can they function without danger to health. W. ROBINSON, B.Sc. (Tech.).

London, W.C.2, *February 13th.*

Mr. H. E. Grafton Watts is incorrect in saying that in my article I suggested that one, or perhaps in special circumstances, 4 to 5 foot-candles is adequate "for nearly all purposes." What I said was that, although with artificial light as well diffused and evenly distributed as daylight we should probably find one foot-candle enough for nearly all purposes, I advocated "about 4 or 5 foot-candles for most purposes and under average conditions."

I have no desire to "reconcile" my figure with the intensities chosen by large numbers of people for reading newsprint under temporary conditions, as I consider the test in question quite worthless. Most people are momentarily attracted (I am myself) by high intensities, and increasing brightness has a pleasant and stimulating psychological effect, but the same intensity which we might choose at first would give most people a severe headache in an hour or two and if inflicted on them regularly for their work or in their homes would soon ruin their sight. Again, the intensity chosen for reading newsprint will depend on the reflective power of the paper and the contrast of the print. I noticed in some of the tests which I witnessed that the newspaper was a very dull grey and the print poor and faint, with the misleading effect that one tended to keep on increasing the intensity in the endeavour to read it comfortably but without much success at any intensity.

Again, if, as is undoubtedly the case, one can see perfectly well for most normal purposes with about 4 or 5 foot-candles (if properly distributed), what is the point of greatly increasing the intensity? It will not give appreciably, if any, clearer vision; the only effect will be a possibly attractive sensation at first, followed by discomfort later and the risk of serious injury to sight ultimately, for which the sufferer has the privilege of paying excessive lamp and energy bills.

The chief danger of needlessly high intensities is perhaps that the eye is liable to lose its resiliency and adaptability to the lower intensities. The point is analogous to using a magnifying glass for reading print which I can read quite clearly without it. Although the glass magnifies the print it does not actually make it clearer and easier to read, but if I insist on using the magnifying glass all day, I shall probably find at the end of the day that I can no longer see the print clearly without it.

Mr. Watts refers to the thousands of foot-candles of daylight. We often read and play tennis, &c., quite comfortably on summer evenings when the daylight intensities are much less than one foot-candle, so that when at last we switch on the artificial light we are momentarily quite startled and dazzled by its brilliance. There is also a great and inevitable difference between the quality of daylight and artificial light. Our eyes were evolved for use by daylight, but artificial light not only has a different mixture of wavelengths but also, and particularly with AC, has a continuous flicker which, even if we are not conscious of it, is beating on the optic nerve, and, of course, the higher the intensity the more powerful and injurious will be the effect of these vibrations on the optic nerve.

London, W.C.2, *February 11th.* G. V. DOWNER.

Qualifying Plumber-jointers

I have followed with interest the letters regarding the qualifying of plumber-jointers. Whilst in complete agreement with the necessity of some form of national qualification, the

question arises whether employers are prepared to offer the necessary incentive to the potential jointer to qualify. If employers are prepared to offer some additional remuneration to a qualified man and stipulate a certain standard of electrical knowledge, in addition to a trade test in jointing, the industry would benefit, and a much better standard of work would result.

Unfortunately the present tendency seems to be to pay the man who has come from the cable gang the same wage as the man who has served an apprenticeship; this is usually the minimum rate of wage applicable to the district. HEYLEN.

February 12th.

Referring to the letter of "Potential Cable Jointer" in your isue of February 10th, an apprentice jointer should have experience in the laying of paper-insulated, lead-covered armoured cables before learning jointing and should know the practical points about different sizes and types of cable. That is where men in the gangs who are interested in plumber-jointing prove their value. An ex-gang jointer knows how a cable should be laid before he joints on it.

I agree with Mr. Maskery that plumber-jointers should pass a test as they have to do under most corporations and companies. Probably 90 per cent. of first-class plumber-jointers were "gang men," as your correspondent calls them (the proper name is "cable hands"), of which I was one before becoming a plumber-jointer. T. MILLAR.

Beverley, Yorks, *February 11th.*

Square Deal for Contractors

I wonder if "Contractor" is a member of the Electrical Contractors' Association? I somehow feel that he cannot be for if he was he would know (as old members do) that he has only to put his complaint before them, and, as if by magic, the supply company concerned would drop this wiring business, provided it was not frozen stiff by the shock.

February 14th. ANOTHER CONTRACTOR.

Electricity in the Textile Industry

In your issue of February 10th Mr. Mallinson suggests that lack of finance is holding back the electrification of the textile industry, and he rightly mentions hire-purchase as a suitable means of overcoming the difficulty.

It should be generally known by now, that any company of good standing is able to obtain plant by hire-purchase. This company, for instance, a subsidiary of United Dominions Trust, Ltd., specialises in providing finance of this kind for the electrical industry, and has handled a considerable volume of business covering all types of electrical plant and equipment.

This specialised finance has many advantages over the ordinary bank facilities or other methods of borrowing. The merchandise itself usually provides all the security needed, and may even pay for itself during the hiring period. The capital outlay too, is regulated over a definite period according to the requirements of the borrowers' business.

UNITED DOMINIONS TRUST (ELECTRIC) LTD.,
W. Lambert,
London, E.C.4, *February 14th.* *Manager.*

Here and There

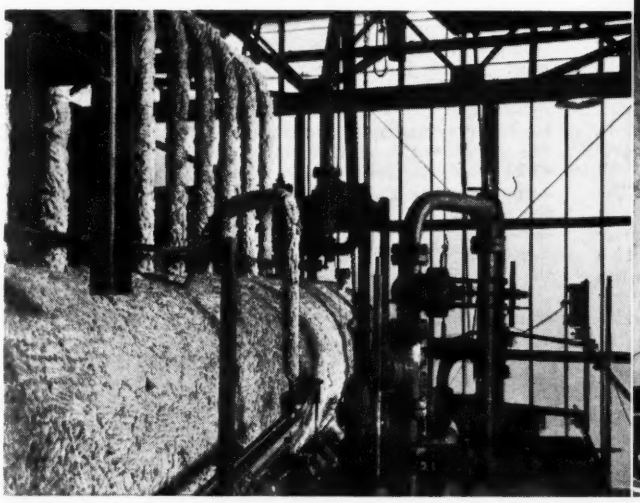
By Nomad

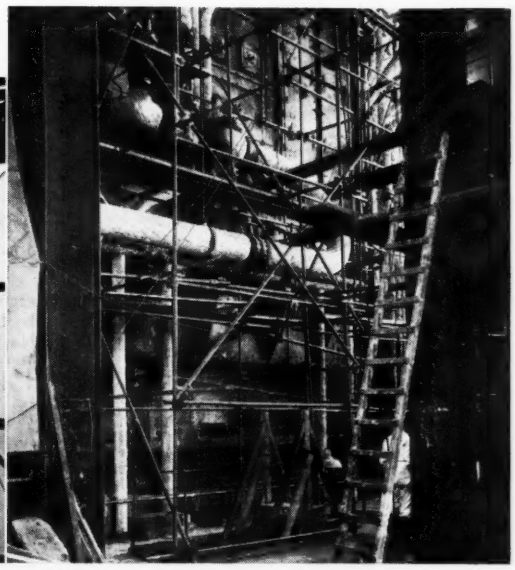
ONE of the most exciting power station "hustle" stories I have ever heard is that which was related to me last week by Mr. L. Howles, general manager of the South Wales Power Co., of how the construction of the new boiler at Upper Boat was hurried forward in time to assist in meeting this winter's load. Erection was started on June 12th last and the boiler was put into commission on December 7th. It is true that the boiler was put on load with hand control—indeed it was still being operated in this manner when I saw it—although it is to be an automatically controlled installation, but I think it was a remarkable piece of work considering the size of the boiler—160,000 lb. per hour normal rating. Many of the "frills" are also still missing and it was an unusual experience to climb the temporary stairs between one floor and the next. Normally, I understand, the boiler would not have been on load until September next.

* * *

The boiler is of the high-head type by Babcock & Wilcox, Ltd., and I was pleased to learn that it will afford another contribution to the advancement of pulverised-fuel firing in this country. Aspirated dust and duff from the local collieries will be consumed. An interesting bearing on the use of such low-grade fuel is the adoption of Redlar conveyors for the new coal-handling plant. Mr. Pugh, station superintendent, assured me that enclosed conveyors are essential for dealing with such fuel. The boiler has Bailey walls, a two-stage superheater, gilled-tube economiser plant and Ljüngstrom air heaters. The chimney discharge will be cleaned by electrostatic precipitation of the dust. Ash handling will be effected on the hydro-jet principle and the equipment will also remove the dust from the precipitation plant and back passes of the boilers. A second new boiler identical with the one now on load is already under construction and provision is being made in the new boiler house, which will have walls entirely of glass, for four such installations.

The new 160,000-lb. boiler at Upper Boat which was put on load in December: left, section of drum; right, side view





* * *

The new boiler plant will raise the station steam conditions to 650 lb. per sq. in. and 850 deg. F. and for the time being the existing turbine plant is being supplied from the new boiler through desuperheating and pressure-reducing equipment. Two new 30,000-kW turbo-alternators are being put down for direct operation from the new boiler plant and very rapid progress is being made with the erection of these, too. When I visited the station last summer the site had been cleared by the removal of five of the earliest sets, but last week I saw the condenser of the first new set in position and nearby the bottom section and the turbine stator appeared to be about ready for lifting into position. The new sets are being installed in the existing turbine room and in view of the lofty character of the latter—quite suitable for the handling of modern plant—I was very surprised to learn that the building was erected in 1903. It seemed a pity to see a cooling tower being erected at Upper Boat for the first time, but the station will soon have outgrown the River Taff. I was glad, however, to hear that it is hoped that the tower will be in use for only three or four months each year.

New Automatic Welding Machine

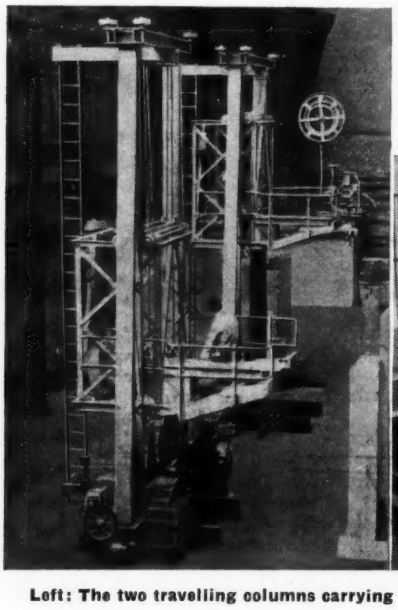
Built by Metropolitan-Vickers for service in Russia

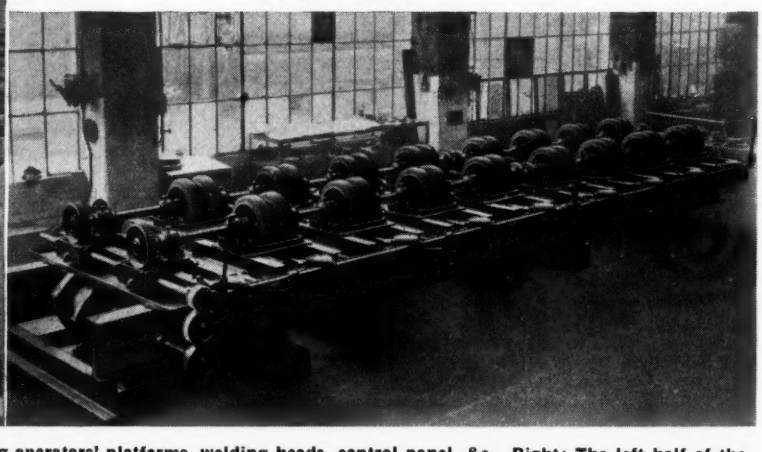
AN automatic arc welding machine designed by the Metropolitan-Vickers Electrical Co., Ltd., for making large boiler drums and built for service in Russia, can be used for both longitudinal and circular welding of cylindrical sections with plates up to 3 in. in thickness; at this thickness the largest cylinder which can be accommodated is 50 ft. in length and 10 ft. 6 in. in diameter, while the minimum size of cylinder which the machine will weld is approximately 3 ft. long and 1 ft. 6 in. in diameter. The longest cylinder the machine can take is 78 ft. long, with diameter 3 ft. 3½ in.

The workbed is approximately 50 ft. long and is made in two independently operated halves, each equipped with eight sets of rubber-tyred rollers on which the job to be welded is placed. The rollers are mounted on cross slides by which means their distance apart may be varied, thus enabling any diameter between 1 ft. 6in. and 11 ft. to be accommodated. They project approximately 2 ft. 6 in. above the floor level, and the front side and two ends of the workbed are left clear to facilitate loading and unloading, and also to permit overhang of particularly long cylinders.

For longitudinal welding the rollers are used as stationary supports for the job. For circular welding, however, they are driven from a common shaft through gearing by a 4-HP variable speed motor. The welding speed range available is 3 in. to 18½ in. per minute, and when the job spans both half workbeds the motors are electrically interlocked and both sets of rollers rotate at the same speed.

Along the floor on the rear side is laid a single rail track on which run two travelling columns, approximately 20 ft. high and built-up of a frame structure, guided in their travel by rollers which bear on both sides of a second guide rail at the top. The floor track is long enough to permit the columns to run clear of any job on the workbed at either end, thus facilitating the loading and unloading of work.



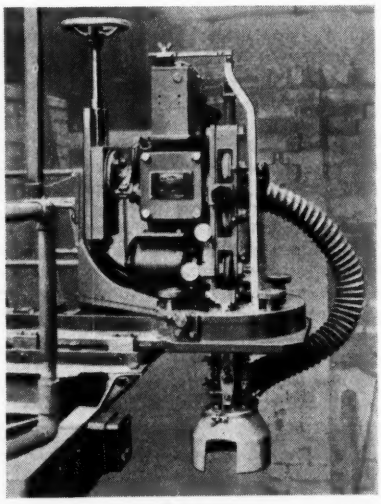


Left: The two travelling columns carrying operators' platforms, welding heads, control panel, &c. Right: The left half of the workbed

Motor drives operate each column independently, or manually, for quick positioning. The motor drives give a welding speed range variable from 3 in. to 18 in. per minute. The operator works in a cage type platform which is mounted on the travelling columns and projects over the workbed. This platform carries the welding head, electrode reel and instrument control panel, and its height can be adjusted by an electric motor hoist. The columns are capable of welding "forward" or "reverse" along the track and, as operators usually prefer to watch the arc from the front of the direction of motion, a seat is provided on each side of the welding head on the platform. On a panel on the platform within easy reach of the operator are the main push-buttons, which are duplicated on the front of the operator's arm-rest, giving very easy control of the main motions.

The machine is fully automatic; when the pre-selector push-buttons are set and one of the main "start" push-buttons is pressed, the electrode is fed down and immediately the arc is established the welding travel motion is automatically started and continues until the arc ceases or the main "stop" push-button is pressed.

The two welding heads, one mounted on each travelling column, are of the "Metrovick" standard covered electrode type. For fume extraction a sheet metal shroud is attached to the collector body just above the arc, from which the fumes are drawn up a flexible rubber hose by a special small extractor fan. They are exhausted through a grille above the machine at the end of a further length of rubber hose. There is provision for vertical and transverse horizontal adjustment of the welding heads for accurately positioning the electrode on the joint. The current for the two welding heads is obtained from two 45 kVA transformers with a secondary range of 230 to 530 A; current regulation is obtained by a series tapped reactor. All the drive motors and control gear operate at 60 V DC, obtained from a 15 kW motor-generator housed with the transformers in a bay at the rear of the welding machine behind the travelling columns.



The automatic welding head for use with covered electrode

For the longitudinal welding of thick plate sections, or wherever multiple passes have to be put into a joint, the two columns with the welding heads mounted on them follow each other along the seam and will weld simultaneously, thus putting down two passes at the same time. At the end of the run in one direction the travel motors on each column are reversed and the welding heads return along the seam. The scale or slag on the weld is easily removed between passes by means of a motor-driven wire brush.

Special electrical interlocks between the travelling column and workbed drives prevent longitudinal welding by the column when the complementary half workbed has been set in operation for circular welding, and *vice versa*. Limit switches on the travelling columns prevent their colliding on the railed track, and in the event of their coming too close together the operation of welding is automatically switched off. Limit switches also prevent overwinding or overlowering the platform.

The work for which this machine is required has called for the development of a new type of electrode available for use with automatic welders generally, and made in three sizes of 3-, 4- and 6-gauge, and, for convenience of handling, in coils limited to about ¼ cwt. in weight and 320 ft. in length. On continuous welding, (*i.e.*, 100 per cent. duty cycle) such a coil will last for approximately four hours with an average rate of deposition of 11 lb. per hour.

PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

THE Mayor and Mayoress of Derby (Ald. and Mrs. D. S. Butler) were among the 230 people who attended the third annual dinner, dance and whist drive of the Derby Branch of the Electrical Industries Benevolent Association on February 10th. **Mr. F. Nicholls,** the borough electrical engineer, who proposed the toast to the Association, stated that the Branch, despite its youth, was in a vigorous and healthy condition. Others present included Messrs. R. G. Payne (president, Nottingham branch), F. W. Burrows, G. E. Power and B. Hallows Garside (general manager, Derby Cables).

Mr. L. M. Waterhouse, who has been with the mains cables section of the Cable Makers' Association for the past thirteen years, has been appointed sales manager of the Power Cables Department of the Telegraph Construction & Maintenance Co., Ltd., in succession to the late Mr. E. Walsh. Mr. Waterhouse will take up his new duties at 22, Old Broad Street, London, E.C.2, on Monday next.

Mr. L. M. Waterhouse

Mr. S. Cameron Gibson, is retiring in May, from the position of borough electrical engineer at Nuneaton, a position which he has held for nearly thirty-eight years.

Mr. H. C. Neale has resigned from H. A. Neale & Co., with whom he has been associated for twelve years. The firm has become a private limited company.

Captain F. W. Gaskins, telephone engineer at Newcastle-on-Tyne, has retired after many years' service in the Post Office. He joined the staff of the National Telephone Co. in Glasgow in 1901 and went to Newcastle in 1903, and in 1912 joined the Post Office telephone system.

Mr. T. H. Bertram, of Stobswood, has been appointed chief electrician to Broomhill Collieries, Ltd., in succession to Mr. G. Mason. Mr. Bertram served his apprenticeship at Stobswood Colliery. At Rutherford College he gained the honours certificate for colliery electrical engineers and the higher national certificate. He has been head electrician with the Mickley Coal Co. for three years.

Mr. T. Benson, who was formerly on the staff of the Bolton Corporation Electricity Department, has been appointed as head station engineer at the Croydon Aerodrome.

The annual dinner and dance of Rist's Cable Works Sports and Social Club was held on February 4th, at the Grand Hotel, Lowestoft. The event was organised by employees of the cable works and other subsidiary companies, which include the Massa Sparking Plug Co., Ltd., Zephyr Engineers, Ltd., Beacon Lamp Co., Ltd., and Waveney Co., Ltd., coach works. A large gathering attended and the chair was taken by the president, **Mr. D. A. V. Rist,** who was accompanied by Mrs. Rist. Among the visitors were the Mayor and Mayoress of Lowestoft (Dr. H. C. and Mrs. Barraclough), Mr. and Mrs. L. McMichael, Mr. A. J. Norman, Mr. and Mrs. L. Rist, and Mr. and Mrs. T. G. Betts. Responding to the toast of "The Firm and the President," Mr. Rist mentioned that during the last month they employed seventy-one more hands. The M.C. for the evening was Mr. L. Rist, who was assisted by members of the club committee. After dinner there was dancing, interspersed by various vocal and instrumental items. For non-dancers, whist, billiards and darts competitions were arranged.

Lord Cadman has accepted the chairmanship of the Television Advisory Committee in succession to the late Lord Selsdon.

Mr. T. Kennedy Stevenson, president of Electrical Research Products, Inc., and a director of the Western Electric Co., Ltd., arrived in England on February 15th on the *Queen Mary* to spend a short time at the London offices. With him is Mr. Joel C. R. Palmer, contract counsel for Electrical Research Products, Inc.

The South Wales Branch of the Association of Mining Electrical Engineers held its annual dinner at Cardiff on February 11th. **Mr. J. Jones,** the Branch president, occupied the chair, and guests included Messrs. H. A. McGuffie (national president); F. H. Davies (chairman, Monmouthshire and South Wales Coalowners' Association); F. B. Kerridge (director, South Wales Coalite Co.); T. E. Alger (vice-chairman, Western Centre, I.E.E.); Ald. C. H. McCale (president, South Wales Branch, Colliery Managers' Association); Major E. Ivor David (past national president); and Mr. S. B. Haslam (national vice-president of the Association). Mr. F. H. Davies, who proposed the toast of "The Association of Mining Electrical Engineers," said that the electricity supply industry had been a boon to the coal trade and it had also been a disturbing factor, because under modern conditions so many more "units" were produced per ton of coal used. In 1913 it used five million tons of coal. To-day the figure was nearer fifteen millions and this was increasing rapidly. In the North of England and Scotland electricity was used in mines to a far greater extent than in South Wales. Local conditions explained this. Mr. H. A. McGuffie, in responding, mentioned that the Association's membership was approaching the 2,800 mark. Mr. F. B. Kerridge, in proposing the toast of "Electrical Industries," said that in South Wales stations plant connected to the grid scheme was actually in the process of being doubled. It was hoped that this increase would be complete by the end of another twelve months. With regard to improved efficiency, grid stations had now reached a figure of 1,571 kWh per ton of coal. In 1910 it was not more than 555 kWh. In 1935 the mines took 19 per cent. of the electricity generated in the country. With regard to the findings of the Commission on Safety in Mines, it was high time that the makers of regulations realised that the prevention of accidents would be achieved by the process of education rather than by regulations. Mr. T. E. Alger, responding, said that the accident rate in mines was remarkably low. It spoke volumes for the manufacturers of mining equipment and also for the mining engineers who installed and operated that gear. Discussing the status of the mining electrical engineer, Mr. Alger said it was high time his great responsibilities and qualifications were recognised.

In our announcement of the wedding of **Capt. B. St. Leger Hughman** in our last issue, we omitted to give the full name of the bride. It should have been Miss Jessie Kinniburgh Macharg.

Mr. C. H. Gray, Companion, I.E.E., was married on Saturday last at the City of London Guildhall to Miss Alison Drake, daughter of Dr. and Mrs. Courtenay H. Drake. Mr. Gray is secretary of the International Executive Council of the World Power Conference, and is a member of the Middle Temple.

[*Elec. Rev. photo.*

Mr. and Mrs. C. H. Gray

Mr. Guy Burney, who will be remembered as the founder and formerly managing director of the Sterling Telephone & Electric Co., Ltd., has recently disposed of a business in which he has been engaged for some years, and proposes to devote his attention to electrical work, preferably of national importance. He is residing at 22, Holland Park Avenue, W.11.

On a recommendation from Mr. W. J. E. Binnie, M.A., as President of the Institution of Civil Engineers for 1938-39, and from Sir William Bragg, O.M., K.B.E., D.Sc., Hon. M.Inst.C.E., as president of the Royal Society, the Council has made the second award of the James Alfred Ewing Medal to **Professor A. H. Gibson,** D.Sc., M.Inst.C.E.

The annual dinner given by the directors of Laurence, Scott & Electromotors, Ltd., to about 250 senior members of the Norwich works was held on February 7th. Before dinner the company stood in silence in memory of Mr. W. H. Scott, the founder, and Mr. T. Scott, his younger son, who both died suddenly last autumn. In proposing the toast of "The Firm," **Captain G. J. Scott** (chairman and managing director) said that the board was looking forward to the day when the present activity in armaments would have ceased, and they had a "long term policy" of new designs and developments to keep the shops filled with orders for motors of all kinds. Export business was being increased, and, given a period of international peace and stability, the future of the company was very bright. The staff and employees shared to a considerable extent in the increased prosperity, and since 1932 the average weekly wage had increased by 60 per cent., and the average staff salary by 40 per cent. This point was also touched on by Mr. G. H. Wilson in the toast of "The Staff and Men," when he referred to the "Prosperity Bonus," the loans without interest to the active social club, and to the provisions made for pensions. Mr. Rackham, for the men, and

Mr. Cook, for the staff, both testified to the excellent spirit which existed throughout the works. The evening was rounded off with an excellent entertainment. Earlier in the week a conference of sales engineers was held to consider the characteristics and application of certain of the company's new products.

OBITUARY

Mr. J. W. D. Cook.—We regret to record the death of Mr. J. W. D. Cook, borough electrical engineer at Barnstaple, which occurred suddenly on February 23rd during a business consultation at the municipal offices. Mr. Cook, who was thirty-seven years of age, was educated at Reading Grammar School and served as a pupil to Mr. G. F. Craven, transport manager and borough electrical engineer, Reading. Subsequently he was appointed assistant engineer at Aylesbury and later became distribution engineer. In 1928 he joined the Nuneaton electricity undertaking as technical assistant and three years later became chief assistant engineer, a position which he held until his appointment as borough electrical engineer at Barnstaple in January, 1937. During his period of control in Barnstaple an extension to the power station was carried out and opened in November, 1937. Mr. Cook was an associate member of the Institutions of Electrical and Civil Engineers. He leaves a widow and one child.

Mr. J. W. D. Cook

Mr. T. Royle.—We regret to learn of the death of Mr. Thomas Royle, manager of the Manchester branch depôt of Davidson & Co., Ltd., which occurred on February 3rd. Before going to Manchester in 1934 Mr. Royle was manager of the company's Glasgow depôt. The funeral took place at Cheadle Cemetery, Manchester, on February 7th.

Mr. G. F. Preston.—It is with regret that we record the death of Mr. George Frederic Preston, C.B.E., M.I.E.E., formerly Controller of the London Post Office Telephone Service, which occurred on February 9th at Ventnor at the age of seventy-seven. Mr. Preston commenced his career in the early eighties, when he joined the Metropolitan Brush concern, and later entered the service of the London & Globe Co. When the latter was taken over by the United Telephone Co., Mr. Preston remained on the engineering staff. He later joined the Northern District Telephone Co. as engineer under Mr. C. B. Clay, and worked on the North-East Coast for five years. When the National Co. took over the Northern District Co., Mr. Preston was appointed to take charge of a large district in the Midlands, and subsequently became superintendent of the Southern Province, which included practically the whole of the Southern and Eastern Counties. In 1901 the Post Office decided to commence an independent telephone service for London, in competition with the National Co.'s system, and Mr. Preston accepted the post of general manager. He occupied that position until 1912, when Government ownership commenced, being then appointed Controller of the London Telephone Service, an office from which he retired in 1923.

Mr. A. F. Paterson.—The death took place at Perth on February 8th of Mr. Andrew Ferguson Paterson, manager of the Grampian Electricity Supply Co. for the counties of Perth, Angus, and Kinross. Mr. Paterson, who was fifty-two years of age, had only been ill a week with influenza when pneumonia developed. He received an appointment in 1914 with the North of Scotland Electric Light & Power Co., Ltd. Two years later he joined the Navy, from which he was demobilised in 1919, having attained the rank of engineer commander. He then returned to the North of Scotland Electric Light & Power Co. as managing engineer, and continued in the service of that company until his appointment as manager of the Grampian Electricity Co. at Perth in 1931.

Mr. A. A. Field.—We regret to record the death of Mr. Albert Austin Field, which occurred at a Leeds nursing home on February 5th at the age of forty-six. After serving in the Peninsular and Oriental Steam Navigation Co. he saw service during the war in Egypt, Palestine and France. For the past eighteen years he was on the staff of the Yorkshire Electric Power Co., and during the last eight years was superintendent of overhead line construction. The funeral took place on February 8th at St. Anne's Cathedral, Leeds, and was attended by a large number of colleagues and friends.

Mr. George Baird, electrical engineer of Pearson & Knowles Engineering Co., Ltd., Warrington, died last week aged forty-six. He served his apprenticeship in the Warrington Corporation Electricity Department. In October, 1917, he went to Pearson & Knowles as assistant electrical engineer and became electrical engineer in 1927.

Mr. W. Rowland.—The death occurred on February 9th in his sixty-ninth year of Mr. William Rowland, of Home & Rowland, Charlton, S.E.

Mr. W. Anderson Brown.—The death occurred early this week of Mr. William Anderson Brown, M.I.E.E., a pioneer in electricity supply, who in 1888 was engaged on the lighting plant for connecting to supply buildings and plant at Deptford.

Will.—Lady Hirst, wife of Lord Hirst of Witton, left £25,352.

Electrical Imports of New Zealand

United Kingdom's share maintained

THE New Zealand Government has recently issued detailed returns for 1937 of the import trade of the Dominion. From these the following figures relating to the electrical trade have been extracted, and notes added of the increases or decreases compared with 1936. It will be seen that the electrical import business has shown further expansion. The United Kingdom's share has been well maintained, Canada has made fair but not spectacular progress, Australia's competition has become more evident, but that of Japan has been only small. The expansion continued during 1938, according to preliminary totals for the nine months, but at a reduced rate. Imports of electrical machinery and equipment aggregated £2,033,310 against £1,960,000, but those of wireless apparatus were only £354,247 against £506,000.

	1937 £(000)	Inc. or dec. on 1936 £(000)
Storage batteries—		
Total	97	+ 28
From United Kingdom	19	+ 1
,, Canada	9	+ 3
,, Australia	66	+ 24
Parts of storage batteries—		
Total	70	+ 42
From United Kingdom	43	+ 38
,, Canada	6	—
,, Australia	67	+ 41
Other batteries and cells—		
Total	82	+ 12
From United Kingdom	33	+ 10
,, Canada	24	— 3
,, Australia	16	+ 7
Carbons or electrodes for arc lamps or for electric welding—		
Total	26	—
From United Kingdom	18	+ 1
,, Australia	1	— 4
Insulated cable and wire—		
Total	496	+ 189
From United Kingdom	468	+ 182
,, Holland	1	— 5
,, United States	9	+ 2
,, Japan	1	—
Insulators—		
Total	45	+ 14
From United Kingdom	27	+ 12
,, Canada	2	— 10
,, United States	8	+ 2
Filament lamps—		
Total	226	+ 42
From United Kingdom	210	+ 41
,, Holland	5	+ 1
,, United States	10	— 1
Other electric lamps—		
Total	59	+ 13
From United Kingdom	21	+ 5
,, Germany	8	+ 4
,, Japan	9	+ 1
,, Australia	3	—
Electric ranges—		
Total	105	+ 43
From United Kingdom	67	+ 21
,, Canada	38	+ 22
Radio receiving sets mounted in cabinets—		
Total	160	+ 58
From United Kingdom	84	+ 57
,, Canada	6	—
,, United States	52	+ 19
,, Australia	16	— 19
Radio receiving sets built up but not in cabinets—		
Total	150	+ 63
From Australia	40	+ 33
,, United States	103	+ 27
Radio valves—		
Total	108	+ 14
From United Kingdom	17	+ 7
,, Holland	4	— 4
,, United States	84	+ 12
Other radio apparatus—		
Total	189	+ 31
From United Kingdom	40	+ 5
,, Holland	1	+ 1
,, United States	78	+ 12
,, Australia	67	+ 13
Other telegraph and telephone apparatus—		
Total	211	+ 107
From United Kingdom	175	+ 85
,, United States	19	+ 10
,, Australia	4	+ 2
Other electrical apparatus (duty free if British)—		
Total	781	+ 151
From United Kingdom	552	+ 82
,, Canada	22	+ 1
,, Germany	18	+ 9
,, Sweden	23	+ 7
,, United States	107	+ 43
,, Australia	44	+ 5
Other electrical apparatus (dutiable)—		
Total	183	+ 58
From United Kingdom	111	+ 28
,, Germany	4	+ 2
,, Canada	13	+ 9
,, United States	21	+ 7
,, Japan	3	—
,, Australia	29	+ 10
Motors and parts—		
Total	250	+ 75
From United Kingdom	134	+ 49
,, Germany	5	+ 2
,, United States	53	— 2
,, Canada	37	+ 22
,, Sweden	14	+ 2

COMMERCIAL AND INDUSTRIAL NEWS

Inspection of Housing Installations. Anglo-German Trade Negotiations. The I.E.E. and National Service. A Colour Lighting Demonstration. London's Electrical Services.

Inspection of Electrical Installation

AT the last meeting of the Kilmarnock Town Council Housing Committee the Town Clerk presented the replies from four insurance companies in response to an invitation to submit proposals for a comprehensive cover in respect of the electrical installations in housing estates, including the periodical inspection of the installations by qualified electricians. It was noted that two of the companies considered that they could not submit terms which the Town Council would regard as an economic proposition and that the rates quoted by the other two were very high. It was agreed that the clerk of works should inspect the electrical installations at new houses; that the repairs inspector should carry out the inspection of electrical installations in houses already occupied and out of the hands of the contractors; and that the clerk of works and the repairs inspector should be each provided with a suitable instrument for testing electrical equipment. Proposals to appoint a qualified electrician to undertake the work and that local electrical contractors should be invited to quote for the work received little support. There was a lengthy discussion at the last meeting of the Town Council when the Committee's recommendation was carried on the casting vote of the Provost.

Turbo-alternator for York

An order for a 20,000-kW Brush-Ljüngstrom turbo-alternator, complete with condensing plant, has been placed with the Brush Electrical Engineering Co., Ltd., by the York Corporation to the specifications of Mr. E. J. Nichols, the city electrical engineer.

Anglo-German Industrial Negotiations

The delegation which the Federation of British Industries is sending to Germany next month in order to enter upon official negotiations with the German Reichsgruppe Industrie on matters of common interest to the industries of the two countries will be composed as follows:—Mr. P. F. Bennett (president of the Federation and chairman of Joseph Lucas, Ltd.); Sir William Larke (chairman of the Tariffs and Commercial Relations Committee); Mr. Guy Locock (director); Mr. R. Glenday (economic adviser); Mr. C. F. I. Ramsden (foreign director); Mr. V. Watlington (member of the Grand Council); Mr. F. E. Jordan (representative in Germany). Mr. Bennett has requested Sir William Larke, as chairman of the F.B.I. committee concerned, to be the official leader of the delegation, as Mr. Bennett himself may not be able to be present during the whole period of the discussions. The object of the discussions will be to continue, on a formal basis, the informal conversations that have already taken place between officials of the two organisations. It is proposed that a general discussion should take place with regard to the problems affecting Anglo-German trade relations, with special reference to competition in third markets. An examination will be made of the readiness of individual industries in both countries to enter into negotiations with regard to the settlement of any difficulties which may confront them.

New Huddersfield Motor Works

To-morrow (Saturday), the new works of Brook Motors, Ltd., which are actually an extension of the company's original Empress Works, Huddersfield, are to be formally opened by the Mayor of Huddersfield. The building consists of 70,000 sq. ft. and houses synthetic moulding, sheet metal fabrication, wire covering, impregnating, and general machine tool sections. Above the works is a canteen, measuring 120 ft. by 90 ft. and capable of dealing with 500 meals at one time. All machinery in the kitchens is electrically driven and there are separate rooms for staff and directors.

A.R.P. Demonstration at Southend

A comprehensive exercise of industrial air raid precautions was staged on February 6th at Southend-on-Sea by E. K. Cole, Ltd., who have devoted five acres of ground to shelters accommodating over 2,000 employees. The exercise began with the sounding of an official air-raid siren. Evacuation of the factory commenced and within seven minutes of the alarm the factory was clear and evacuation into the shelters was complete.

The emergency generator in the E. K. Cole A.R.P. shelter

The shelters, based on Home Office recommendations, are intended as a permanent structure, and extensions still to be carried out will provide accommodation for a total of over 3,000 employees. The equipment of the trenches, or galleries, includes an intercommunication telephone system, radio sets, first-aid quarters, sanitary accommodation, stretchers, supplies of drinking water, blankets, picks, shovels, torches, washing bowls, water heaters and electrical plugs for the connection of portable "Thermovent" heaters. An elaborate system of emergency lighting has been installed to ensure that in no circumstances can the trenches be brought to complete darkness. A supply of electricity is laid on from the Corporation mains and in the event of a breakdown recourse can be made to a portable generator system housed in an underground power room of reinforced concrete, situated in a central position between the trenches. Each rectangle of galleries has a double ring main separately connected to the emergency generator. The wiring is arranged in such a way that only in the event of four separate and well-distributed breaks would lighting supplies be interrupted. As a further precautionary measure there is an auxiliary battery system of individual wall torches, stationed at brief intervals throughout the galleries. The company states that facilities will be granted to responsible persons for viewing the shelters.

Voluntary National Service

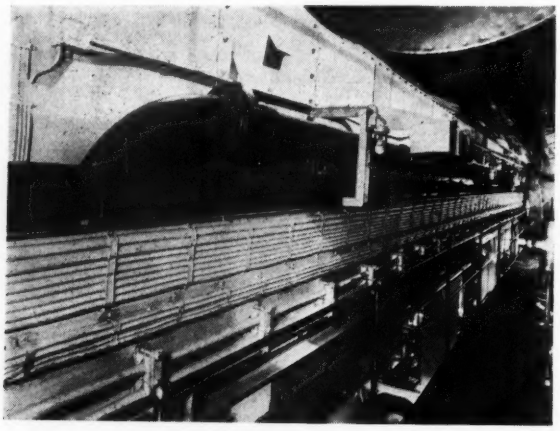
The President of the Institution of Electrical Engineers has accepted an invitation to serve upon the Central Register Advisory Council which the Minister of Labour and the Lord Privy Seal have appointed. It consists of representatives of the service departments, employers, and the major professional scientific and technical organisations, and will advise the Minister in regard to the work of the Central Register of Engineers and Scientists. The Register is being established by the Ministry of Labour and will, it is understood, be used

The exterior of the new works of Brook Motors, Ltd. (Right) The works canteen

in the event of a national emergency for co-ordinating scientific and technical personnel, and for selecting for both Government and other work additional personnel with scientific and technical qualifications, and persons qualified for administrative posts. The Institution has been asked to co-operate in the work of compiling the Register, and a questionnaire for issue to members is in course of preparation.

The "Dominion Monarch"

The electrical equipment of the new motor vessel, *Dominion Monarch*, reference to which was made in our last issue, includes 160 miles of Callender cables. There are four motor engines producing 32,000 BHP, and an auxiliary power station



Part of the cable run on the "Dominion Monarch"

capable of an output of 3,000 kW. The watertight doors are electrically operated, and in addition to the complete room telephone service provision is made for linking up the ship's exchange to the shore system at ports of call. The extent of the electrical equipment is indicated by the Callender cable installed, which is all rubber insulated, single- and multi-core, and includes 124 miles of taped heat-resisting 250 and 660 V C.M.A. grade, fifteen miles of taped, braided and specially varnished telephone cable and four miles of lead alloy sheathed 250 and 660 V grade.

The "Blue Book"

The 1939 edition of the "Electrical Trades Directory and Handbook (the "Blue Book") has just been published (Benn Bros., Ltd., 25s. net). This year's volume is the fifty-seventh annual issue, and its 1,180 pages cover the whole electrical industry of the United Kingdom. Three sections are devoted to the classification, alphabetically, geographically, and by trade or profession, of between 13,000 and 14,000 persons, firms and organisations, aggregating between 40,000 and 50,000 separate entries. General information useful to engineers and business men is contained in the handbook section. The British classified section has thumb tabs which facilitate reference to particular headings.

Radio Transmitter for Siam

The Siamese Administration has for some time been planning an important extension of its broadcasting system and has placed an order for a 100-kW national broadcasting station at Bangkok with Standard Telephones & Cables, Ltd. The order, which will amount to approximately £60,000, includes a "Standard-Blaw-Knox" vertical mast anti-fading aerial and extensive studio equipment.

Ormskirk Modern Homes Exhibition

Miss Mason, the Cotton Queen of Great Britain, visited the stand of the Ormskirk Electric Supply Co., Ltd. (an associated company of the L.E.P.) at the recent Ormskirk Modern Homes Exhibition and received as a memento a high-speed electric kettle from Mr. L. Loukes, the district manager. Many hundreds of people visited the company's stand and good business was done. Film shows and cooking demonstrations were staged twice daily, and cake weight-guessing competitions were included. The exhibition lasted six days, closing last Saturday.

Electricity in London

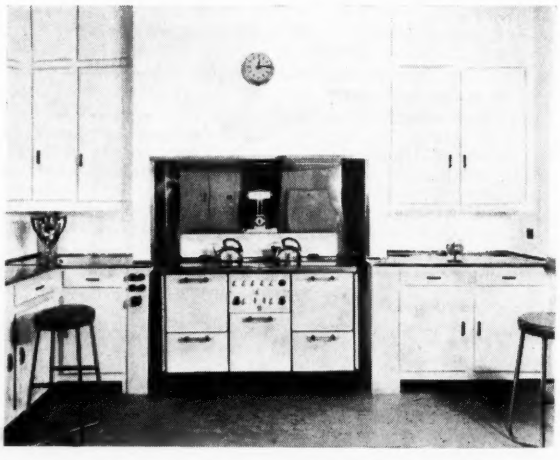
Any impression that Continental capitals are better served with regard to domestic electrical services was dispelled last Friday by Mr. C. Parker, managing director of Central London Electricity, Ltd., and a director of the London Power Co., Ltd., at the eighth business hour luncheon of the London Branch of the Electrical Association for Women at the Criterion Restaurant, Piccadilly, W.1. Mr. Parker said that while electricity supply in London was in the hands of a conglomeration of large and small undertakings that of the Continental capitals was more coherent. Taking London as a whole, there was not much to choose between the facilities offered by the municipally owned or private undertakings: the former, perhaps, supplied electricity at lower prices, but the companies gave better after-service. In Germany and Italy electricity was required for other purposes, largely for armaments, he feared, and Germany, at any rate, did not favour the use of electricity for domestic purposes. Matters were better in Scandinavia, but service facilities were not anything like so good as in London. In Denmark it was the policy to keep the price of gas below that of electricity. Only in Paris could the housewife find anything like the service that was given in London. The policy there was mainly to build up the load through agents, and much door-to-door work was done by canvassers. In many European capitals it was practically impossible to hire apparatus. The reason was that on the Continent incomes fluctuated considerably more than they did in this country. It was not possible for manufacturers to build apparatus to last if there was no stratum of solidarity in the position of the users. Manufacturers had given much attention to the provision of all the needs of the housewife. On the Continent practically all manufacturing was in the hands of Germany and America. Generally, the design was good, but less attention was paid to efficient working. Wiring, too, was bad, and he could not see how matters were going to be improved. London was much better off, but although it had a fair record of success, it had not yet reached perfection. The development of electricity had to some extent an effect on the standard of living, and it enabled the housewife to have more leisure time. In the totalitarian countries the housewife was largely deprived of the means of utilising electrical labour-saving devices, whereas the use of electricity proceeded a little faster in democratic countries. A vote of thanks to Mr. Parker was proposed by Mrs. G. F. Scott. The chair was taken by Councillor Mrs. Gregory.

Efficient Workshop Lighting

That the extra cost of improved lighting was insignificant compared with the increase in production was emphasised by Mr. W. G. Galley during a lecture on "Works Lighting as a Productive Investment" on two evenings during the Factories Act Exhibition held by Manchester Corporation Electricity Department. Mr. Galley referred to the functioning of the human eye under various conditions of lighting and the effect of this functioning on the operative's efficiency. He mentioned the relationship between lighting and production and faults in industrial lighting. The value of modern types of vapour discharge lamps for higher intensity plus economy in current consumption was also referred to. Lantern slides and demonstrations added to the value of the address. The display and demonstration, which closed on Tuesday last after a fortnight's run, proved very informative for principals and works managers, comprising as it did a wide range of equipment for efficiency and economy. A number of electrical manufacturers lent apparatus for the exhibition.

A Modern Kitchen

The accompanying illustration shows part of the kitchen of Mr. T. L. Moffat, managing director of Moffats, Ltd., which has recently been modernised by the installation of a Moffat electric cooker and refrigerator. The picture shows the old-fashioned kitchen fireplace which has been transformed by the installation of an electric cooker and a monel metal lining. The cooker is the company's de-luxe model 265-7, equipped with five-in-line "Cook-Quick" boiling plates and monel metal cooking top. There are two large baking ovens,



A modern kitchen showing a Moffatt de luxe electric cooker

each of the "Circulaire" type with selector switch and "Thermomatic" control. Two warming ovens and a utility compartment in the centre complete the main units of the cooker. The modern tubular lamp unit on the cooker includes a timer and condiment set. The equipment of the kitchen also includes one of the company's refrigerators.

E.L.M.A. Design Courses

Following on the success of last year's provincial illumination design courses the E.L.M.A. Lighting Service Bureau has

under consideration the holding of similar courses this year in Leeds, Derby and Southampton in the spring and Edinburgh, Liverpool, Swansea and Plymouth or Exeter in the autumn.

A Colour Lighting Demonstration

Demonstrations of novel and beautiful lighting effects were given in a special stage show in the Holophane Theatre on February 7th to a large audience. The Corlett Players, in association with the technical experts of Holophane, Ltd., provided an excellent show which lasted about two hours. The various items were presented and lighted by R. G. Williams, chief colour engineer, who also gave a short address on the technique of colour lighting and demonstrated the possibilities of the auto-selective control system. A photographic model of a motor-car was shown and by means of changes of light different parts were made to disappear or come into prominence. There was also a stage scene which was changed from an English countryside to an Indian Temple simply by altering the lighting. The item which was most enjoyed was a stage fantasy entitled "Princess Ilsa," written especially by Miss Renee Corlett for the Holophane Theatre. The story is based on a legend of the Brocken Mountains, and opportunities are provided for almost every kind of lighting effect. The scene takes place on the top of a mountain and the possibilities of a cyclorama background with cloud effects were clearly shown. The Holophane moulded contour system of interior decorative lighting was demonstrated, arousing considerable interest. It was seen that by changes in the direction of light the appearance and shape of decorative objects could be changed with marked effects on the appearance of the decorative scheme.

New E.C.A. Members

At a recent meeting of the E.C.A. council the following contractors were admitted to full membership:—

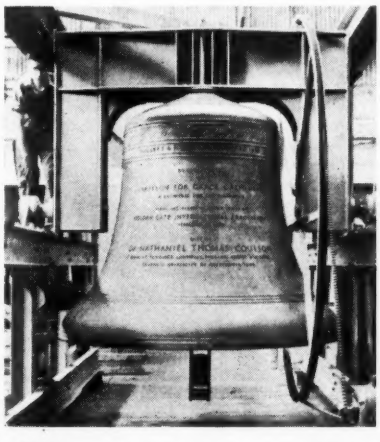
Thomasson & Hartley, Shrewsbury; P. W. Child, Wyke Regis; W. R. Cockings, Weymouth; Davis & Hadley, Portland; W. O. Knell & Co., Weymouth; Scott & Scott, Ltd., Bournemouth; R. L. Weyman, Reforme, Easton, Portland; Pepper & Haywood, Royston, Herts.; Stuart Johnstone, Cardiff; E. W. Smith, Deal; The Central Electric Co. (Liverpool), Ltd., Liverpool, 1; J. W. Lewsley, Ltd., Nottingham; H. G. Deeley & Co., Cradley Heath, Staffs; W. H. Allen & Co., 14, Bonny Lane, N.W.1; Bucknells, Ltd., 25, Park Street, N.W.1; Boyce Bros., 87, Fortess Road, N.W.5; Gibrico Elec., Ltd., 179, Hampstead Road, N.W.1; W. Margolis, 38, Hanway Street, W.1; Sims & Sims, 115, Parkway, N.W.1; R. C. Stone, 2, Lemble Street, N.W.5; W. T. Toms & Sons, Roger Street, W.C.1; F. Howell, Whitstable; E. Caton & Son, Lancaster; Electrical Engineers, Ltd., 18, Endell Street, W.C.2; A. Munday, Ltd., 59, Watling Street, E.C.4; J. Parsons & Son, Salisbury; Hartnell Bros., Taunton; W. Moggridge, Taunton; F. J. Serle, Taunton; F. C. Spear, Ltd., Taunton.

The following contractors were admitted to associate membership:

Marshall & Son, Portland; T. Ash, Northiam; E. K. Williamson, Taunton.

Carillon for Golden Gate Exhibition

The carillon to be installed in the 400 ft. "Tower of the Sun" at the Golden Gate International Exhibition, San Francisco, has forty-four bells cast by Gillett & Johnston, of Croydon, with a total weight of 18 tons. The Bourdon weighs nearly 5½ tons,



The Bourdon bell of the carillion for the Golden Gate Exhibition

and is swung by a 2 HP, 3-phase Crompton Parkinson "Tork" motor. The remaining bells are operated pneumatically from a compressor driven by a 5 HP "Tork" motor. At the close of the exhibition the carillon will be permanently installed in Grace Cathedral, San Francisco. It will there be played by remote control from a keyboard at the organ console. The bells can also be operated by an automatic roll player.

Action of Soldering Fluxes

A new publication of the International Tin Research and Development Council, No. 88, is a study of the spreading of molten solders over copper under a layer of resin or chloride flux. The "spreading power" is evaluated from measurements of the contact angle between the solder and the copper and of the interfacial tension between the solder and the flux. A bluish halo effect around droplets of molten solder on copper is considered to be due to electrochemical deposition of tin from stannous chloride produced by the flux in contact with the solder. The fact that solders spread better than pure tin in either flux is ascribed to their lower surface tensions, but their adhesion is not inferior. The report describes the apparatus used and gives the readings obtained. Copies may be obtained from the secretary, International Tin Research & Development Council, Fraser Road, Greenford, Middlesex.

Dover Electrical Exhibition

On February 2nd and 3rd a presentation of the new E.D.A. talking films was given by the Dover Corporation Electricity Department in the Town Hall. The films were shown three times on each day, and the total attendance was over 2,000. In the adjoining Maison Dieu an exhibition of domestic electrical appliances was staged which proved a great attraction

A section of the electrical exhibition recently held by the Dover Electricity Department

and from which much business has already resulted. The Maison Dieu is a stone hall built by Hubert de Burgh, then Constable of Dover Castle, in the year 1203, and contains a valuable collection of ancient weapons and armour. The stained glass windows are said to be the finest in the country An exhibition of modern electrical apparatus in such an historic setting is probably unique, and the accompanying picture of a part of the exhibit gives some idea of this.

Registered Electrical Contractors

At the last meeting of the Executive Committee of the National Register of Electrical Installation Contractors the following applications for registration were accepted:—

A. Bartle & Son, Hull.
Tom Jones (Electrical Engineers), Ltd., Wavertree, Liverpool, 15.
N. Thomson, Motherwell.
Beckenham Electrical Co., Ltd., Beckenham.
Robert Batey & Co., Carlisle.
Abbey Truck & Electrical Co., Liverpool, 20.
A. Dean & Co. (Norbury), Ltd., Norbury, London, S.W.16.
Belshaw & Co., Ltd., 25, Ebury Street, London, S.W.1.

At the same meeting one application was withdrawn and two were declined.

Trade Announcements

Galsworthy, Ltd., have removed their showrooms for electric light fittings and domestic appliances from Newman Street to their works address at 21, Varndell Street, Hampstead Road, N.W.1. This will enable the company to concentrate their manufacturing, designing, technical and showroom staff under one roof.

Linolite, Ltd., has made arrangements with Mr. B. Rowe to operate a branch depôt on behalf of the company at Leith Buildings, 34, Moorfields, Liverpool, 2 (telephone: Bank 94314), where he will act as the company's agent.

MacGregor and McCallum, Ltd., London, announce a new arrangement under which both they and the Ace Electric Co., Huddersfield, will handle the full range of "Magic" vacuum-cup washers, "Mayfair" gyrator washers and "Ace" gyrator washing machines. The 10J grey "Ace" washer takes the place of the "Vogue" washer, which is now discontinued. The Ace Electric Co. will handle all sales in the counties of Northumberland, Westmorland, Cumberland, Durham, Yorkshire, Lancashire, Staffordshire, Warwickshire, Derbyshire and Cheshire. MacGregor & McCallum will handle sales throughout the rest of the country, including Wales and Scotland. Stocks of machines will be held at Huddersfield, Manchester, Newcastle, Hull, Birmingham and London. This arrangement comes into force as from March 6th.

The Hackbridge Cable Co., Ltd., has removed its offices to Kelvin House, 5/7, Lower Belgrave Street, London, S.W.1.

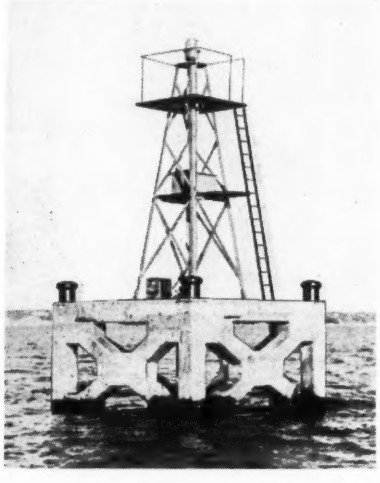
Philips' Blackburn Factory

Immediate plans to double the present size of the Philips factory at Blackburn and to transfer certain important manufacturing processes from other factories were announced by Mr. J. Visman, managing director of Philips Blackburn

Works, Ltd., during the official visit to the factory by the Mayor of Blackburn, the chairman of the Blackburn Industrial Development Committee and other leading officials in Blackburn civic and industrial circles, reference to which was made in our last issue. The first of the new activities will be the manufacture of lamp filaments from the raw tungsten and other metals. Constructional work on the new buildings will be started immediately and new wire drawing and filament making machines will be installed as soon as the extensions are completed. It is also hoped at a later date to transfer other activities to Blackburn, such as glass making and the manufacture of the lamp bulbs.

A Marine Lighting Development

The provision of a neon light to illuminate the dolphin which marks the end of the training bank in Poole Harbour opens up new possibilities not only in the marine field but also in advertising and other signs. The lamp is operated from an ordinary 6- or 12-V battery in a water-tight casing, and actually the electricity consumption is so small that it will work for a considerable period on quite a small dry battery. In fact, Mr. Collier told us of one occasion when a battery too run down to operate a bell would still light the neon tubing. The interrupted current, obtained by a special type of vibrator, is stepped up to 10,000 V by means of a small transformer, the secondary winding of which is connected to the electrodes of a short spiral of neon tubing. The intermittent light is produced by an electically operated make-and-break mechanism, which can be adjusted to give any flash characteristic desired, the flash being guaranteed to 1/10th sec. A switch is provided in the circuit for cutting out the transformer and vibrator when the make-and-break movement is required to operate an ordinary incandescent lamp or a sound signal. The light at Poole measures 7 in. high by 8 in. in diameter, and the operating mechanism is all contained in a compact box measuring only about a foot cube. A light-sensitive switch automatically extinguishes the light at daybreak and switches it on again at dusk. Since the light was installed about six weeks ago it has received no attention whatever, and there has been no drop in the voltage of the accumulator. It is expected that the accumulator will last from six to nine months, depending, of course, on the size of the light or sound signal, though in practice it will probably be replaced about every three or four months. The ease with which this can be done, coupled with the low cost as compared with acetylene, will no doubt appeal to harbour authorities. The inventors of the lamp are Mr. A. P. Collier and Mr. John Dossett, of Collier & Co., Ltd. Mr. Collier introduced the first acetylene buoy in Great Britain over thirty years ago.



The dolphin in Poole Harbour
(*Davis, Bournemouth*)

E.C.A. (Eastern Counties)

The Colchester Branch of the E.C.A., in conjunction with the local branch of the E.I.B.A., is holding a dinner and dance on March 29th at the Red Lion Hotel, Colchester. Mr. B. L. Kay, the hon. secretary of the branch, informs us that a regional conference of the E.C.A. in the Eastern Counties (Southend, Chelmsford, Cambridge, East Anglian and Colchester Branches) will be held at the Red Lion Hotel on the same day, and it is hoped that delegates will take their ladies and join in the social arrangements made by the Colchester Branch for that day, which includes a tour of the borough.

An Engineers' Directory

"The Directory and Buyers' Guide, 1939," which is published by *The Engineer*, is in similar form to previous editions, containing a classified list of engineering concerns in this country with their addresses. The directory is circulated throughout the world, and for the benefit of foreign users the technical headings used are translated into French, German, Italian and Spanish. It is issued free of charge.

Japan to Develop Electrical Exports

According to the *Far Eastern Review* the Japan Electric Appliances Export Association is planning to charter a steamer, load it with electrical goods made in Japan and send it on a half-year cruise to overseas markets, mainly the Philippines, Australia, Madagascar, India, Ceylon, Burma, the Straits Settlements, Siam and Java, for direct sales. The ship will sail in June next if the plan is approved by the Japanese Ministry of Commerce and Industry. The party will be composed of a hundred persons representing the member firms of the Association, each taking thirty-five tons of electrical goods with them, and fifty representatives of other firms affiliated with the Association with one to ten tons of similar productions, in addition to a group of students who intend to engage later in the electrical goods trade.

British Overseas Electrical Trade

Further substantial exports of electrical machinery during January brought the value of electrical equipment exported during the month to a level which has only once been exceeded in recent years. At £1,922,505 the total was £58,953 higher than in January last year. Imports of electrical equipment were valued at £270,181, against £327,330 in the corresponding month of 1938. Details of the trade will appear in our next issue.

Norwich Electrical Exhibition

The Norwich and District E.D.A. Circle is to hold an electrical exhibition at the Assembly Rooms, Norwich, from February 22nd to March 4th. This decision was taken at a meeting of the Circle at Duke Street headquarters on February 10th. Mr. J. J. Hunt, of the Simplex Electrical Co., Ltd., lectured on the developments in installation equipment. He considered that the conduit system was still the best wiring scheme for new buildings, affording the best protection and becoming comparatively ineffective only when the conduit was too tightly packed. He also explained the processes of manufacture and enamelling.

New Finnish Radio Station

The *Financial Times* reports that it is announced in Helsingfors that the Government of Finland has placed a contract with Marconi's Wireless Telegraph Co. for the supply of a 50-kW short-wave broadcast transmitter to be erected in the neighbourhood of the Finnish capital. The apparatus will be manufactured at the Marconi works at Chelmsford and the erection will be completed by the Marconi Co.'s engineers. The contract was obtained in competition with American, Dutch, French and German companies.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

CHEMICALS, ETC.	Price February 15th.	Fortnight's inc. or dec.
a Acid Oxalic ... ... per cwt.	50s.	—
a Ammoniac, Sal ... ... per ton	£37	—
a Ammonia, Muriate (large crystal)... ,,	£18 10s.	—
a Borax... ... ... ,,	£17	—
a Copper, Sulphate ... ... ,,	£19	—
a Potash, Chlorate ... ... per lb.	3¾d. to 4¼d.	—
a ,, Perchlorate ... ... ,,	6d.	—
a Shellac ... ... per cwt.	£4 8s.	—
a Sulphur, Commercial ... ... per ton	£11	—
a ,, Roll ... ... ,,	£11	—
a Soda, Chlorate ... ... per lb.	3¼d. to 3⅜d.	—
a ,, Crystals ... ... per ton	£5 to £5 5s.	—
a Sodium, Bichromate, casks ... per lb.	4½d. net.	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£94	—
b ,, Wire ... ... per lb.	1/1 to 1/9	—
b ,, Sheet and Foil ... ... ,,	1/2½ to 2/9	—
p Babbits Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£199	£2 inc.
Grade II ... ... ,,	£138	£1 inc.
Grade III ... ... ,,	£73	£1 inc.
c Brass (rolled metal 2" to 12" basis)... per lb.	8¼d.	—
c ,, Tubes (solid drawn) ... ... ,,	11¼d. to 11½d.	—
c ,, Wire, basis ... ... ,,	8¼d.	—
c Copper Tubes (solid drawn) ... ,,	1/0¾d.	—
g ,, Bars (best selected) ... per tonM		—
g ,, Sheet ... ... ,, M	£78	—
g ,, Rod ... ... ,, M		—
d ,, (Electrolytic) Bars ... ... ,,	£48 5s.	5s. dec.
d ,, ,, Wire Rods ... ,,	£53	5s. dec.
d ,, ,, H.C. Wire ... per lb.	7 1/16d.	—
f Ebonite Rod ½" dia. & up. ... ,,	1/10 to 2/5	—
f ,, Sheet ×" thick & up ... ,,	1/5 to 1/10	—
n German Silver Wire, Nos. 1 to 12... ,,	2/4	—
h Gutta-percha, fine ... ... ,,	Nom.	—
h India-rubber, Para-fine ... ... ,,	7d.	¼d. dec.
i Iron, Pig (Cleveland, No. 3) ... per ton	£4 15s.	—
i ,, Wire galv. No. 1 P.O. Qual... ,,	£23	—
g Lead, English Pig ... ... ,,	£16 5s.	10s. dec.
g Mercury ... ... per bot.	£16 8s.	£1 8s. inc.
e Mica (in original cases) small ... per lb.	10d. to 2/–	—
e ,, ,, ,, medium ... ,,	6/– to 12/6	—
e ,, ,, ,, large ... ,,	13/– to 17/6 up	—
p Phosphor Bronze, plain castings ... ,,	1/2¼	—
p ,, ,, drawn bars & rods ,,	1/1d.	—
p ,, ,, rolled strip & sheet ,,	1/1¼d.	—
p ,, ,, wire ... ... ,,	1/1¾d.	—
o Platinum ... ... per oz.	£7 10s.	—
d Silicum Bronze Wire ... ... per lb.	8 1/16d.	1/16d. dec.
g Spelter ... ... per ton	£13 10s.	5s. dec.
g Tin, Block (English) ... ... ,,	£214 5s.	£2 5s. dec.
n ,, Wire, Nos. 1 to 16 ... ... per lb.	3/6	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.
h Edward Till & Co.
i Bolling & Lowe.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicum bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in this section under the same heading.

Russian Electrical Machinery Imports

A recently issued return shows that, taking roubles at 10 to the £, electrical machinery and allied material to a value of £4,898,900 was imported into Russia during the nine months ending with September last as compared with £3,552,900 in the corresponding period of 1937.

New Standard Specifications

A further specification (No. 827) in the series of British Standards dealing with the suppression of radio interference has just been published. It prescribes the limits of the intensity of the interference-producing electric field set up by the electrical equipment of tramcars and trolley-buses and by the overhead lines. It also gives the standard rating and certain safety requirements for the condensers, resistors, and chokes used for the purpose of reducing the interference, together with some general information regarding the methods of suppression that have been found satisfactory in service. Appendices deal fully with the nature of the interference caused by the various items of equipment and figures are given for typical values, together with the reduction in interference that can be brought about by the use of suppressors. The document is in fact far more than a specification and is in effect an abridged textbook on the causes and cure of interference radiated by trolley-buses and tramcars. Copies of this British Standard (No. 827-1939) may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d. by post.

Since the specification for electric lamps for railway signalling purposes was first published in 1932 it has been found possible to do without several of the lamps which were originally standardised, while several comparatively new types have come into general use. The latter have, therefore, been included in the revised edition of the specification just issued as B.S.469—1939, which includes, in an appendix, details of those lamps originally included, but which are now regarded as obsolescent, for reference when such lamps are required for replacement purposes. Copies of this British Standard, No. 8, may be obtained at 2s. each, or 2s. 2d. post free.

Reduction Gear Ratings

The Keighley Gear Co. has devised a calculator for the benefit of its customers who have adopted "2-Three" worm reducers as standard for nominal or small horse-powers. This enables the correct size to be selected for any specific duty.

New Catalogues and Lists

Atlantic Appliances, Ltd., 138, Southwark Street, London, S.E.1.—A leaflet dealing with the Batwin "Flashtest" pocket tester; also a list of "Ensign" lamps.

Cochrane's (Middlesbro') Foundry, Ltd., Ormesby Iron Works, Middlesbrough.—A stock list of cast-iron and spun-iron pipes.

Gothic Electrical Supplies, Ltd., 23-25, Constitution Hill, Birmingham, 19.—A 42-page catalogue of domestic electrical appliances in simple tabular form.

Elliott Brothers (London), Ltd., Century Works, Lewisham, London, S.E.13.—Details of new rectifier-type recording ammeters and voltmeters.

Leslie Dixon & Co., 218, Upper Thames Street, London, E.C.4.—A list of "Electradix" electrical apparatus which is being offered to the constructor and experimenter at exceptionally low prices.

Trix Electrical Co., Ltd., 65, Bolsover Street, Great Portland Street, London, W.1.—A series of leaflets dealing with public address equipment.

Buell Combustion Co., Ltd., 49, Moorgate, London, E.C.2.—Details of the Buell "Micro-Lector" dust separators for flue gases.

Private Arrangements

R. D. White, radio and electrical engineer, 11, Westgate, Baildon.—The creditors interested met recently when a statement of affairs was presented which disclosed liabilities totalling £2,182. The net assets were £776, leaving a deficiency of £1,406. The deficiency was attributed to the losses on trading totalling £772, drawings £573, and the depreciation written off the assets in the statement of affairs. The creditors resolved that a committee should be appointed to consider the best method of administering the estate.

A. J. Robinson, electrical and radio dealer, Southfield Lane, Bradford.—At a recent meeting of creditors a statement of affairs was submitted showing liabilities of £302. The net assets were £228, leaving a deficiency of £74. It was decided that the debtor should execute a deed of assignment to Mr. L. W. Mosley, C.A., 4, Town Hall Street, Bradford, as trustee.

Bankruptcy Proceedings

C. Street, 164, Preston Old Road, Blackpool (trading as Fylde Crystal Lamp Co.), and formerly carrying on business at 55, Coronation Street, Blackpool, electric lamp distributor.—This debtor applied for his discharge recently at the Court House, South King Street, Blackpool. The receiving order had been made in 1936, and the Official Receiver said that debtor attributed his failure to being supplied with defective lamps. The discharge was granted, subject to two months' suspension.

C. Oldfield, 45, Silver Street, Manningham, Bradford, formerly carrying on business at 136A, Listerhills Road, Bradford, as a radio dealer.—At the first meeting of creditors held at the Official Receiver's Office, Hallfield Chambers, 71, Manningham Lane, Bradford, on February 7th, it was reported that there was a deficiency on the statement of affairs of £191. Debtor said his present position was due to insufficient turnover, loss on forced sale of goods under execution and inability to collect debts due. The case was left in the hands of the Official Receiver, as trustee.

B. Harris, lately trading as Central Radio, 144, Kingsland High Street, E., wireless dealer.—This debtor petitioned the London Bankruptcy Court on January 25th and was adjudged bankrupt the same day. The first meeting of creditors was held on February 8th, when a statement of affairs was presented showing liabilities of £1,407, against net assets of £149, after deducting £60 for payment of preferential claims. The business was commenced by debtor in December, 1937, but owing to keen competition and other causes it never paid; on January 9th it was closed and the debtor subsequently executed a deed of assignment. He attributes his failure to inexperience, keen competition, lack of capital and bad hire-purchase risks. The case was left with the Official Receiver.

R. W. Bradley and **B. R. Bradley** (trading as W. Bradley & Sons), 75, York Road, Woking, electrical contractors.—The receiving order was made on the debtors' own petition recently. They have returned ranking liabilities of £1,713 and net assets of £274, leaving a deficiency of £1,439. Debtors attribute their failure to underestimating, increase in cost of materials and labour, and insufficient gross profit to meet overhead charges and drawings.

C. E. Ross and **T. E. Perks** (Ross & Perks), electrical engineers, 166, Piccadilly, London.—Receiving order made February 2nd on a creditor's petition. Public examination April 25th at Bankruptcy Buildings, Carey Street, London, W.C.2.

L. W. Russell (Russells Radio Service), radio and electrical engineer, 142, Gravelly Hill North, Erdington, Birmingham.—Receiving order made February 3rd on debtor's own petition. First meeting February 20th at 37, Temple Street, Birmingham. Public examination March 8th at the Court House, Corporation Street, Birmingham.

H. W. Blythe, radio dealer, 64, High Street, Bognor Regis.—Receiving order made February 2nd on debtor's own petition. Public examination April 14th at the Court House, Brighton.

J. W. Watson, electrical engineer, 154, Aldborough Road, Seven Kings, Essex.—Receiving order made February 2nd on debtor's own petition.

D. Ll. Lewis, electrical products manufacturer, 332, Oxford Road, Manchester.—Public examination March 10th at the Court House, Manchester.

V. W. Henry, radio and electrical engineer, Acle, Norfolk.—Last day for receiving proofs for dividend February 24th. Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich.

D. O. Rogers, wireless dealer, 29, Hillside Road, Meadowville Estate, Holway, Holywell, and 1, East Parade, Rhyl.—First meeting February 17th at St. Peter's Churchyard, The Cross, Chester. Public examination March 31st at the Court House, Bangor.

T. J. Mathews (Universal Radio), wireless dealer, 40, Rumbridge Street, Totton, Hants, formerly carrying on business at Shirley, Southampton, and Winchester.—Discharge suspended for one year until January 17th, 1940.

G. S. Newlove, electrical contractor, 74, Crosby Avenue, and late 42, Dale Street, Scunthorpe.—First and final dividend of 9⅝d. in the £, payable February 18th at 8, Flottergate, Great Grimsby.

Company Liquidations

John McClure, Ltd., radio manufacturers, Warren House, Warren Road, Uxbridge.—At the statutory meeting of the creditors a statement of affairs was submitted which showed liabilities of £4,151. The net assets were £628, leaving a deficiency of £3,523. The creditors decided to confirm the voluntary liquidation of the company with Mr. A. E. Middleton, of Cole Dickins & Hill, 18, Essex Street, Strand, London, W.C., as liquidator. A committee was also appointed. Particulars of claims are to be sent to the liquidator by February 24th.

Excelsior Electric Cleaner Co., Ltd.—Winding up voluntarily. Liquidator, Mr. A. G. T. Oakley, 52, Queen Victoria Street, London, E.C.

Birmingham Traders' Electrical Association, Ltd.—Particulars of claims by March 11th to the liquidator, Mr. A. Cripwell, 12, Cherry Street, Birmingham.

Attwoods (Factors), Ltd.—Particulars of claims by March 17th to Mr. C. Latham, 185-188, High Holborn, London, W.C.1.

Deacons Radio, Ltd.—Meetings March 11th at 133-139, Finsbury Pavement, E.C.2, to receive an account of the winding-up by the liquidator, Mr. H. Rainsbury.

Oxford Electric Co., Ltd.—Meeting March 3rd at Thames House, Millbank, S.W.1 to receive an account of the winding-up by the liquidator, Mr. E. J. Harrison.

Glais Electrical Co., Ltd.—Meeting March 6th at 75, Exchange Buildings, Swansea, to receive an account of the winding-up by the liquidator, Mr. B. Holbrook.

H.D. Switchgear Co., Ltd.—Winding up voluntarily. Liquidator, Mr. P. A. Dilger, 4, Selwyn Road, Bilston.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

RELIANCE fire.

ELECTRICITY SUPPLY

Darwen Tenants' Petition. Salisbury Lighting Contract Controversy. Uxbridge Undertaking Decision. Special Bridge Lighting in Worcestershire

Barnsley.—LOAN.—Application is being made by the Electricity Committee for permission to borrow £10,000 for wiring installations.

Bedford.—ELECTRIC LIGHTING.—The Highways Committee is to provide electric lighting for the trunk road at a cost of £3,811, and £1,346 is to be spent for improving the lighting of other roads.

ILLUMINATIONS.—The Parks Committee is arranging for illuminations during the summer along the embankment and riverside at a cost of £250.

SUB-STATION.—The Electricity Committee is to erect a sub-station in Eugster Avenue, Kempston.

Burton-on-Trent.—SUPPLY AT NEWBOROUGH.—The Electricity Committee is seeking an Order to give a supply of electricity to premises at Newborough.

Cheltenham.—BETTER LIGHTING.—The lighting of London Road and High Street is to be improved at a cost of £1,339.

NEW PLANT.—At a meeting of the Electricity Committee recently the electrical engineer reported that as a result of the cold spell just before Christmas an exceptionally heavy and unforeseen load had been imposed on the transformers and switchgear at the various sub-stations and he recommended that considerable additions to this plant should be made before next winter to deal with the normal growth of the load and the possibility of a similar severe frost occurring again.

SUPPLY TO BATH AND WEST SHOW.—Next year the Bath and West Show is to be held at Cheltenham and the electrical enginer has been instructed to prepare a scheme for providing a supply of electricity to the show grounds.

Chesterfield.—CHANGE-OVER.—The Electricity Committee is to change over the supply in the Ashgate Road area to AC at a cost of £1,670.

SUB-STATIONS.—Additional transformer sub-stations and equipment are to be provided by the Electricity Committee at a cost of £2,853.

Colchester.—EXTENSIONS.—The Electricity Department is to provide low-voltage distribution in the Lower Heath Farm district at an estimated cost of £172, and afford a supply of electricity to Abberton Rectory and cottages adjoining.

Darwen.—DEPUTATION OF TENANTS.—The Housing Committee is to receive a deputation of tenants of the Hollins Grove estate who have presented a petition for the installation of electricity in the houses.

Doncaster.—SUB-STATION.—A new rectifier sub-station is to be built by direct labour at Wheatley Park.

Keswick.—ELECTRICITY FOR COUNCIL HOUSES.—Electricity, provided by the Keswick Electric Light Co., is to be substituted for gas in the Council's houses on the Headland estate.

Glasgow.—NEW STATION PROJECTED.—It was reported at this week's meeting of the Electricity Committee that the Corporation had been asked by the Central Electricity Board to erect a large power station within the city area. It is said that the cost of the new station would be in the neighbourhood of £2,000,000 and that it would be required to be in operation by 1946.

Great Yarmouth.—STREET LIGHTING.—As part of a large street-lighting scheme costing £13,193 the Finance Committee has been asked to consent to application being made for permission to borrow £4,143 for improvements in forty-eight of the more important secondary roads.

ELECTRIC HEATING AT A SWIMMING POOL.—Subject to a grant being obtained from the National Fitness Committee, the Town Council has accepted a tender of the electrical engineer amounting to £598 for the installation of apparatus for heating the water at the Gorleston swimming pool.

Hawkhurst.—CONVERSION OF LIGHTING.—The Parish Council has decided to convert existing gas lamps to electric. The work will be carried out by the Weald Electricity Co.

Hove.—AIR RAID PRECAUTIONS.—The Electricity Committee is to provide spare machinery and mains, &c., for air-raid precautions at a cost of £1,519.

Lanarkshire.—ELECTRIC SCHOOL HEATING.—After hearing complaints of the lack of heating at Carmunnock School, Lanarkshire School Management Committee has agreed with a recommendation that the Education Committee should install tubular heating with thermostatic control.

Leven (Fife).—STREET LIGHTING.—The Town Council, after discussing a proposal that the principal street of the town should be lighted by electricity, has agreed that estimates for both gas and electricity shall be considered.

Lowestoft.—LOAN.—The Town Council is making application to the Electricity Commissioners for sanction to a loan of £16,000 for services and mains.

SUPPLY EXTENSION.—The Electricity Committee has authorised the electrical engineer to extend the cable to give a supply of electricity to the East Anglian Roadstone Co., Lowestoft, subject to the company entering into an agreement to guarantee a return of not less than 20 per cent. per annum on the outlay of £725 for a period of five years.

ELECTRICITY AT THE TRADE FAIR.—The Electricity and Transport Committee is to participate in this year's Trade Fair, which is to be held at the Empire Hall, Lowestoft, from March 22nd to 29th. The necessary supply line is to be installed, and it is suggested that three stands should be taken.

Motherwell.—EXTENSIONS TO PLANT.—The Town Council has approved a recommendation by the Electricity Committee for an extension scheme at an aggregate cost of £24,600. The conversion to AC in certain areas at an estimated cost of £11,630 has also been approved.

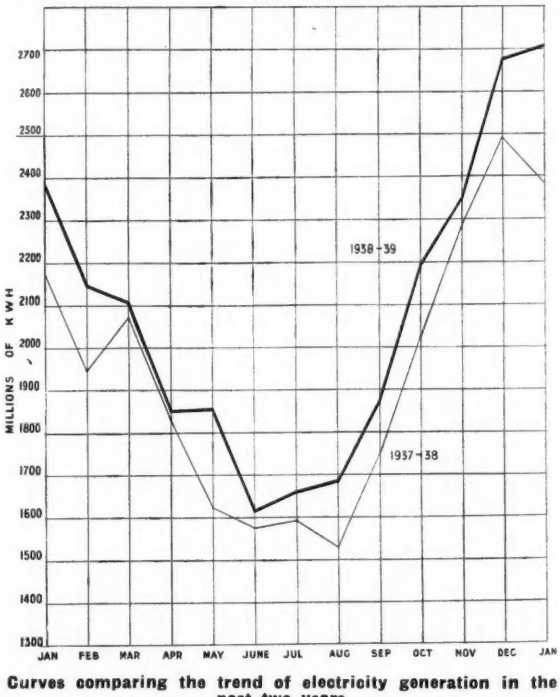
Newark (Notts).—LIGHTING SYSTEM.—The electrical engineer (Mr. R. E. Livesley) is to submit details of a new lighting system for the main roads to the Notts County Council.

Rushden.—SUB-STATION.—The Rushden and District Electricity Supply Co. is to erect a sub-station at Beech Road, Rushden.

Salisbury.—INQUIRY INTO LIGHTING CONTRACT.—The City Council has appointed a committee of inquiry to investigate the circumstances under which a contract of the Salisbury Electric Light & Power Co. for the lighting of the classified roads in the city was obtained. Councillor Bigwood said he was going to make, and hoped to prove, three allegations: that the Council was misled with regard to the tender for lighting A30 and other trunk roads; that two tenders for lighting those roads were not received; and that, as the tenders were not received, no legal contract could be made under the provisions of the Local Government Act, 1933, and the Council's own Standing Order No. 49. Two competitive tenders were not obtained because the Gas Co. had been asked in February last year for only preliminary estimates and had submitted nothing else. It had no reply until December, when it was told that it had lost the tender. The Electric Light Co., on the other hand, was asked to quote on a ten years' contract, no mention of which had been made in the invitation to the gas company, which, he alleged, was given no specifications, no hours of lighting, etc., upon which to tender. Alderman

Generation of Electricity in January

OFFICIAL returns rendered to the Electricity Commissioners show that 2,704 million kWh was generated by authorised undertakings in Great Britain during January, as compared with the revised figure of 2,382 million kWh in the



Curves comparing the trend of electricity generation in the past two years

corresponding month of 1938, representing an increase of 322 million kWh, or 13.5 per cent. The number of working days in the month (*i.e.*, excluding Sundays) was twenty-six, the same as last year.

H. Medway, acting chairman of the General Purposes Committee, said that estimates were obtained from the gas and electricity companies for lighting all trunk roads, and both were placed before the Committee. The estimate of the electric light company was 35 per cent. cheaper than that of the gas company, and the meeting decided in favour of electricity for all classified roads. There were no special circumstances to prevent the extra percentage cost applying to the scheme for lighting for all Class A and B roads. The financial estimate accepted from the electricity company was for ten years, and the cost of lighting the roads, less the Ministry of Transport's grant for A30 roads of £1,875, would be £10,700. Maintenance and running costs would be £2,198, less Ministry of Transport contribution, £439, making £1,759. The total cost, in addition to a considerable increase in the standard of illumination, included all night lighting of all lamps on A30 road, in place of approximately 27 per cent. of the lamps on this road at present.

Scarborough. — ESTIMATED EXPENDITURE. — The Electricity Committee is to incur the following expenditure during the coming financial year: Change-over apparatus, £1,000; mains and services, £14,200; meters, £2,000; consumers' apparatus, £8,000; transformers, £1,000; and sub-station equipment, £1,200.

ASSISTED WIRING.—The Electricity Committee has adopted a schedule of charges submitted by the electrical engineer for installations carried out by the Council under the assisted wiring scheme for domestic premises. The charges range from £4 15s. for three lights and one heating plug to £9 for eight lights and one heating plug.

Scunthorpe.—SHOWROOMS.—The sum of £7,500 has been agreed as the share of Scunthorpe electricity undertaking in the £22,000 combined electrical and gas showrooms and library to be built at the corner of High Street and Oswald Street.

EXTENSIONS.—A sum of £3,037 is to be expended in connection with extensions to sub-stations. Application is to be made for sanction to a loan of £650 in respect of the wiring of a further 100 houses under the assisted wiring scheme.

South Shields.—X-RAY EQUIPMENT.—The Town Council has decided to include £800 for an X-ray room and equipment at its new tuberculosis hospital at Simonside.

Spenborough.—SUB-STATION.—The Electrical Distribution of Yorkshire, Ltd., is to erect a sub-station in Far Common Road, Roberttown.

Stockton-on-Tees.—SUB-STATION.—The Rural District Council has approved a plan for a sub-station at Hart for the North-Eastern Electric Supply Co., Ltd.

Stoke-on-Trent.—SUPPLY SCHEMES.—The Electricity Committee is to provide a supply at a cost of £600 for an electric kiln in Sunderland Road, Longton. It is also to provide an additional supply to the Abbey Holton housing estate at a cost of £800 and to other housing estates at a cost of £1,930. Mains are to be extended and a sub-station equipped at Bucknall at a cost of £4,400.

ILLUMINATIONS.—The Parks Committee has approved estimates by the borough electrical engineer and the parks superintendent for illuminations at a cost of £825.

Swansea.—SUPPLY FOR FACTORY.—The electricity supply for the new Government factory at Landore, which is now nearly completed, is to be taken from the Swansea Corporation at 33,000 V and stepped down on the site to 400 V.

MAINS AND EQUIPMENT.—The Electricity Committee is to provide additional extra-high-voltage mains and a sub-station and equipment at a cost of £7,029. Low-voltage mains extensions are to be carried out at an estimated cost of £7,442.

Uxbridge.—J.E.A.'s APPLICATION REFUSED.—The Electricity Commissioners have rejected the application of the London and Home Counties J.E.A. for permission to acquire the rights of the local authorities concerned to purchase the undertaking of the Uxbridge and District Electricity Supply Co., Ltd. It is stated that the grounds for refusal were that the J.E.A.'s case was not based on any scheme for immediate or specific improvement, technical or otherwise, in the supply of electricity in the area.

Walsall.—A.R.P. SCHEME.—A £3,245 scheme for air-raid protection for the electricity undertaking has been recommended by the Electric Supply Committee.

FRINGE ORDER.—The Electricity Committee is seeking a Fringe Order to supply twenty-eight premises in Hobnock Road, Essington.

SUB-STATION.—The Committee is to erect a sub-station and extend mains at a cost of £19,490.

West Hartlepool.—IMPROVEMENTS TO SYSTEM.—The Town Council is to carry out improvements to its electricity system, including the purchase of transformers for various sub-stations and the laying of additional cables.

Weymouth.—EXTENSIONS.—The Electricity Committee is to extend mains to Winfrith (£218) and Monkton (£173) and extend high-voltage mains to provide an additional transformer at West Lulworth at a cost of £1,053.

EMERGENCY GENERATION.—The Electricity Committee is asking the Central Electricity Board to receive a deputation to consider the question of the desirability of the Council's generating station being kept in commission for use in case of emergency.

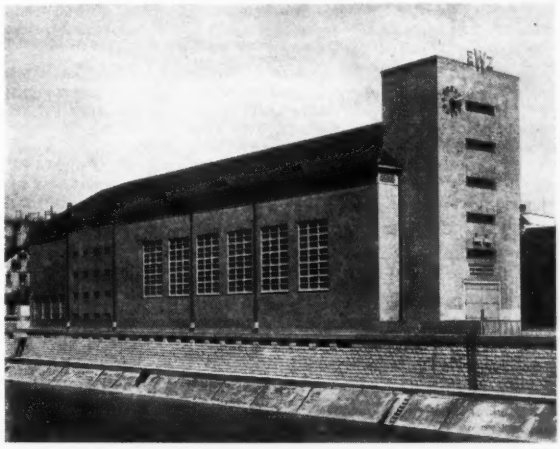
Wolverhampton.—SUPPLY EXTENSIONS.—A supply is to be provided to Gailey (£347), Neachley (£111) and Lapley (£154).

Worcestershire.—BRIDGE LIGHTING.—The Highways Committee reports that in order to avoid interference with the appearance of the structure of the Upton-on-Severn bridge by the erection of ordinary street lighting standards the county surveyor has devised a scheme for the lighting of the bridge by means of tubular lamps to be set in panels in the top capping of the main girders, thus diffusing the light downwards on to the carriageway.

Workington.—SUPPLY EXTENSION.—The Electricity Committee is seeking sanction to borrow £3,350 for a supply to Northside and Siddick.

Overseas

Arabia.—ELECTRIC LIGHTING SCHEME.—Mecca, venue of pilgrimage for the Moslem world, is to be provided with electric lighting, states the *Palestine Post*.



The accompanying photograph shows the imposing new headquarters of the municipal electricity undertaking at Zurich, where the Swiss National Exhibition is to take place from May to October. A complete pavilion is being devoted to electricity

Canada.—ELECTRICITY PRODUCTION.—The output of electricity during 1938 totalled 25,994.2 million kWh compared with 27,583.9 million in 1937.

Dutch East Indies.—PROPOSED HYDRO-ELECTRIC SCHEME.—It is announced from Buitenzorg that the Billiton Maatschappij has received a concession from the Dutch East Indian Government for the utilisation of the water power of the Asshan River to the extent of 20,000 HP in connection with the establishment of an aluminium industry.

Eire.—DUBLIN SUPPLY.—The Greater Dublin Tribunal in its report which was published recently recommended that virtually the whole of County Dublin should be incorporated in the city area. If this recommendation is implemented by Act of Parliament the consumers of electricity in the rural areas would be entitled to receive electricity at the same rates as those living in the present city area, and there is a likelihood that Dublin consumers might have to foot the bill. The Dublin Chamber of Commerce obtained a special clause in the Electricity Act of 1927 protecting the interests of the Dublin consumers and ensuring that they would not be penalised by any expenditure as the result of the Electricity Supply Board giving supplies to consumers in the rest of the country. This provision would not apply to Greater Dublin, however, and the Chamber has asked the Board what would be its position in the event of the recommendations of the Tribunal being carried into effect.

(*Continued on next page.*)

Loans for Electricity Undertakings

THE Electricity Commissioners have decided to issue four-weekly statements, giving particulars of the loan sanctions issued by them to public authorities (*i.e.*, joint electricity authorities, joint electricity boards and local authorities). In the first of these it is stated that during the nine months from April 1st, to December 31st, 1938, the Commissioners sanctioned loans for electricity supply purposes amounting in all to £17,527,628, compared with £12,371,117 in the corresponding period of 1937. The amounts sanctioned during the nine months ended December 31st, 1938, included thirteen individual sanctions of £250,000 or more, the largest being a sanction of £2,000,000 issued to the Birmingham Corporation and one of £613,057 issued to the West Midlands Joint Electricity Authority; both these amounts related to the extension of selected generating stations.

During the period of four weeks from January 1st to 28th last, the Commissioners sanctioned the borrowing of a total sum of £1,958,168, including £500,000 for the Leeds Corporation (extensions at the Kirkstall power station) and £450,000 for the West Midlands J.E.A. (extensions at the Wolverhampton power station).

THE LIFFEY SCHEME.—Work has just commenced on the foundations for the new power house at Poulaphouca in connection with the Liffey hydro-electric scheme. About five hundred employees are at present excavating the rock and preparing for the pouring of the concrete where two 15,000-kW sets are to be installed. Work on the smaller power house which will be built some distance from the main one will be commenced in the coming month.

TRACTION

Belgium.—BRUSSELS ADOPTS ELECTRIC TROLLEY BUSES.—Following the example of Liége and Antwerp, trolley buses are now being introduced into Brussels, a first order for seven vehicles having lately been completed by the Brossel Co. of that city. The single-deck vehicles have seating accommodation for forty-eight passengers, there being also room for ten or twelve standing on the enclosed rear platform. The electrical part of the chassis is of A.C.E.C. manufacture, the motors being centrally mounted and driving the rear axle through bevel gearing.

Liverpool.—REFUND TO TRANSPORT UNDERTAKING.—The Electric Power and Lighting Committee has agreed to a refund of £18,182 to the local passenger transport undertaking in respect of the supply of electricity for traction during the year ended March 31st. Discussions have been proceeding between the two committees as to the basis of determining the cost of electricity required for tramway traction.

Glasgow.—CATHCART CIRCLE RAILWAY.—The Committee on Unemployment has agreed to approach the railway companies with regard to the electrification of the Cathcart Circle railway and lines to the Ayrshire coast.

Halifax.—TRAMWAY ABANDONMENT.—On Tuesday the last tram route was discontinued, the service being taken over by buses.

COMMUNICATIONS

Great Britain.—GLASGOW TO OBAN TELEPHONE LINK.—The Duke of Argyll on February 9th opened the new 90-mile underground telephone cable linking Glasgow and Oban. The official ceremony took place in a new repeater station built near Inveraray. The scheme thus completed is one of the biggest communication works in the Highlands. Crossing Loch Awe, the cables were fixed to a series of casks floating on the surface of the water, and the casks were then holed and the entire length of cable sank to its resting-place on the bed of the loch. The successful conclusion of the scheme is a tribute to the direction of Mr. F. I. Ray, telephone manager for Scotland West, who shortly takes up the post of Controller of Telecommunications for the North-Western Area of England.

POST OFFICE RADIO STATION.—Plans for the construction of a new radio station on North Uist have been approved by the Post Office Telephone Dept. The station, which should be in operation at the end of the autumn, will relay between Barra and Stornoway, where similar stations are being completed, and will also transmit and receive messages on a direct beam to Skye. Inter-island telephone services are expected to be available in the Hebrides early in May, the traffic being operated through automatic exchanges,

Sweden. — TELEPHONE COMMUNICATION PROGRESS. — The Swedish Telegraph Board reports an unusually rapid advance in the number of telephone subscribers. There are now roughly 125 telephones per 1,000 inhabitants, against 118 per 1,000 at the close of 1937.

FINANCIAL SECTION

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares.

New Companies Registered

Briton Lamps, Ltd.—Private company. Registered February 6th. Nominal capital, £100. Objects: To carry on the business of manufacturers, suppliers and distributors of and dealers in electric lamps and accessories, devices, fittings, electrical articles and appliances, &c. Subscribers: S. Disborough and J. B. Williams, both of 18, Austin Friars, E.C.2. Solicitors: Slaughter & May, 18, Austin Friars, E.C.2.

London Radio Engineers, Ltd.—Private company. Registered February 8th. Capital, £300. Objects: To carry on the business of electricians, mechanical engineers, manufacturers of wireless, scientific instruments, &c. Directors: Mrs. N. F. Chapman, 17, Lascotts Road, Wood Green, N.22, and W. L. Schaffer, 69, Sandford Avenue, Wood Green, N.22. Secretary: Mrs. N. F. Chapman. Registered office: 44, Ranelagh Road, S.W.1.

Brilite Sign Co., Ltd.—Private company. Registered February 6th. Capital, £2,000. Objects: To carry on the business of manufacturers of and dealers in electrical signs, advertising appliances, apparatus and media, electric discharge tubes, carbon and tungsten arc lamps, &c. Directors: A. H. Creuziger, 56, Belgrave Road, S.W.1, and G. J. Hudson, 6, Oliver Avenue, South Norwood, S.E.25. Secretary: D. J. Hodgkinson. Registered office: Coastal Chambers, 172, Buckingham Palace Road, S.W.1.

Automatic Stoker Installations, Ltd.—Private company. Registered February 7th. Capital, £100. Objects: To act as technical advisers in connection with the design and installation of mechanical stoking equipment, and to carry on the business of heating and ventilating engineers, designers and installers of process heat treament, air-conditioning plants and central heating systems, suppliers of electric light, &c. Permanent directors: F. St. J. Austen, 24, West Park Avenue, Kew Gardens, Surrey, and F. B. Turpin, 43, Russell Gardens, N.W.11.

Hornsey Radio & Television, Ltd.—Private company. Registered February 11th. Capital, £100, shares of £1 each. Objects: To carry on the business of manufacturers, repairers, and hirers of and dealers in electrical and mechanical apparatus and accessories and components, and in particular radio sets and valves, radio-gramophones, &c. Directors: R. Wainwright and D. Wainwright, both of 508a, Hornsey Road, N.19. Registered office: 508a, Hornsey Road, N.19.

Warbridge Electrical Products, Ltd.—Private company. Registered February 9th. Capital, £100. Objects: To carry on the business of manufacturers of and dealers in electrical and mechanical apparatus, accessories and components and in particular vacuum cleaners, sweepers, lamps, irons, refrigerators, razors, washing machines, radio sets, &c. Subscribers: P. de G. V. C. Warren, 56, Cheyne Court, Chelsea, S.W.3; and C. T. Tunbridge, 14, Lavender Gardens, S.W.11. Solicitor: J. G. A. Pickford, 323, High Holborn, W.C.1.

Electrical Contractors (Kingston). Ltd.—Private company. Registered February 9th. Capital, £500. Objects: To carry on the business of manufacturers and repairers of and dealers in dynamos, motors, armatures, magnetos, batteries, stoves, cookers, rubber, insulating materials, &c. Directors: A. Lake, "Collan," Beechwood Avenue, Weybridge; and L. Lake, 2, Stuart Avenue, Walton-on-Thames. Registered office: Balfour House, Finsbury Pavement, E.C.

Townsley Hey & Co., Ltd.—Private company. Registered February 10th. Capital, £1,000. Objects: To acquire the business of manufacturers' agents heretofore carried on by D. Hey and E. N. Townsley in co-partnership as "Townsley & Hey," and to carry on the business of manufacturers of and dealers in rubber goods of all descriptions, horns, pumps, lamps, incandescent goods, sparking plugs, batteries, accumulators, electrical engineers, &c. The directors are: L. E. Hird and A. H. Hird, both of Moor View Drive, Exley Road, Keighley; E. N. Townsley, 48, Ash Road, Leeds; and D. Hey, 2, Slack Lane, Oakworth, Keighley. Registered office: Central Chambers, North Street, Keighley.

Alloys & Minerals, Ltd.—Private company. Registered February 10th. Capital, £300. Objects: To carry on the business of dealers in and exporters or importers of any metal or alloy, mineral, ore, organic or inorganic substances, electrical, mechanical, chemical and general engineers, &c. The directors are: P. W. Smith, 9, Bycullah Road, Enfield; P. G. Smith, 48, The Avenue, Potters Bar, Middlesex; and B. Lillywhite, "Bryaris," West Hill Road, Woking. Solicitors: Wild Collins & Crosse, Kennan's House, Crown Court, Cheapside, E.C.

Returns of Electrical Companies

Statements of Capital

British Electrical Export Co., Ltd.—Capital, £2,000 in 2,000 ordinary shares of £1. Return dated May 18th, 1938 (filed February 6th, 1939). 198 shares taken up. £198 paid. Mortgages and charges, nil.

Barbados Electric Supply Corporation, Ltd.—Capital, £200,000 in £1 shares. Return dated December 5th, 1938. 140,000 shares taken up. £78,051 paid. £61,949 considered as paid. Mortgages and charges, nil.

Century Power & Light, Ltd.—Capital, £100 in 200 shares of 10s. each. Return dated December 6th, 1938. Seven shares taken up. £3 10s. paid. Mortgages and charges, nil.

Baxter & Caunter, Ltd.—Capital, £10,00 in 6,000 cumulative 5 per cent. preference and 4,000 ordinary shares of £1. Return dated December 6th, 1938. 4,000 preference and 3,002 ordinary shares taken up. £7,002 paid. Mortgages and charges, nil.

Wessex Ignition Co., Ltd.—Capital, £100 in £1 shares. Return dated October 11th (filed January 20th). All shares taken up. £2 paid, £98 considered as paid. Mortgages and charges nil.

Corwen Electric Light Co., Ltd.—Capital, £2,000 in £1 shares. Return dated November 30th. 1,610 shares taken up. £1,610 paid. Mortgages and charges nil.

Mullard Wireless Service Co., Ltd.—Capital, £10,100 in 10,000 "A" and 100 "B" shares of £1. Return dated November 30th. All shares taken up. £9,300 paid, £800 considered as paid. Mortgages and charges nil.

Grays Electrical Co., Ltd.—Capital, £1,000 in £1 shares. Return dated December 1st, 1938. 1,000 shares taken up. £260 paid, £740 considered as paid. Mortgages and charges nil.

McGoff & Vickers, Ltd.—Capital, £2,000 in £1 shares. Return dated November 30th. 1,750 shares taken up. £1,750 paid. Mortgages and charges nil.

Mortgages and Charges

Locke and Soares, Ltd.—Particulars filed of debentures to secure £5,000 and premium of 3½ per cent. authorised January 31st, 1939, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £4,500.

Cotto Products, Ltd.—Mortgage on Enterprise Works, Digby Street, Scunthorpe, dated January 27th, 1939, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Watkins and Smith, Ltd.—Satisfaction to the extent of £1,250 on January 31st, 1939, of debenture registered May 21st, 1935.

Receiver Appointed

Standard Switchgear, Ltd.—C. F. Bland, of 11, Sir Isaac's Walk, Colchester, was appointed receiver on January 31st, 1939, under powers contained in debenture dated July 2nd, 1936.

Increase of Capital

Murphy Radio, Ltd.—The nominal capital has been increased by the addition of £69,680 beyond the registered capital of £80,320. The additional capital is divided into 64,930 ordinary shares of £1 and 95,000 "A" ordinary shares of 1s.

Reports and Dividends

The London Power Co., Ltd., reports an increase in total receipts of £209,093 to £3,794,522 for 1938. Coal and other generation costs expanded by £126,894 to £1,648,164, maintenance, &c., by £13,828 to £162,177, rents and rates by £11,930 to £246,578, general expenses by £853 to £68,976, debenture interest by £9,820 to £834,558, sinking fund "A" by £6,976 to £181,393, and sinking fund "B" by £36,638 to £578,312. Transmission and other charges totalled £71,358, against £69,205. The fixed dividend of 6 per cent. on the 50,000 shares of £1 again absorbs £3,000.

The annual meeting of the company was held on February 10th when Mr. G. Balfour (chairman), who presided, said that the work on large extensions to the Battersea power station was inspected by the directors three months ago. According to the chief engineer's forecast, additional plant would be required for the loads anticipated three years hence, and orders for such plant would have to be settled in the near future. The maximum load on the company's generating stations at Battersea, Deptford and Willesden, excluding any superimposed grid peak, was 488,480 kW. and including supplies to the grid from these stations was 560,900 kW. In addition to the foregoing, the Bow and Grove Road stations, which were operated solely on behalf of the Central Electricity Board for grid supplies, had during the year a maximum peak of 95,400 kW. The total output of the generating stations amounted to 2,363 million kWh, of which 1,432 million kWh was absorbed by their constituent companies and Metropolitan western area and 931 million kWh for the purpose of the Central Electricity Board. The increase in supply to their constituent companies was approximately 55 million kWh and to the Central Board a decrease of 5½ million kWh. With regard to the unsatisfactory price received from the C.E.B., the Board knew that it did not make a commercial contribution to the cost of interest on capital or sinking fund on the 931 million kWh it passed on to other authorities, and they trusted that ere long it would realise that some appropriate and substantial payment must be made. The construction works on the second section of the Battersea power station ("Battersea B") had proceeded according to programme. It would operate at an initial pressure of 1,350 lb. and a temperature of 950 deg. F. They anticipated an appreciable increase in efficiency in Battersea B. which should be in operation towards the end of next year. The cost of coal last year showed an increase of 1s. 9½d. per ton over 1937, and they had met these charges without any appreciable increase in charges to any of their constituent companies. Approximately two-thirds of the increased cost of coal was recovered under coal clause payments in agreements with the railway companies, the Central Electricity Board and the Metropolitan Co. Two additional steam colliers were delivered and put into service during the year, making their fleet up to ten.

Ismay Industries, Ltd., reports a gross income from dividends and interest of £36,929 for the sixteen months to October 31st last, plus underwriting commission, £2,500, making £39,429. For the year ended June 30th, 1937, the total income was £68,144. After deducting income-tax, fees, and sundry expenses (including £11,900 bank interest and £39,611 loss on investments realised), there is a net loss of £31,104, as compared with a net profit of £52,384 for the preceding twelve months, when a dividend of 6 per cent., less tax, was paid on the ordinary shares. The balance of £12,444 brought in reduces the current loss to £18,660. The preference dividend for the year to June 30th, 1938, was paid out of the special reserve of £50,000; no preference dividend is recommended for the half-year to December 31st. The directors state that the new management has sold at satisfactory prices the company's interests in Sterling Batteries and Britannia Electric Lamp Works The subsidiary, Ismay Cables, has sold its undertaking and assets, and although this sale shows a substantial loss on the original investment, it relieved the parent company of onerous obligations on guarantees and avoided the need of providing a further substantial amount of money for a business that was not a profit-making concern. By these realisations the company reduced its pressing indebtedness to bankers in respect of overdrafts and guarantees by approximately £500,000. The principal trading businesses of the Ismay group are now being carried on through the Sterling Engineering Co. (formerly Sterling Works (Dagenham)), Sterling Electric Holdings (formerly John Ismay & Sons), and the Sterling Commercial Guarantee Co. (replacing the Hire Purchase Finance Corporation). Ismay Industries has retained its holding of over 1,000,000 ordinary shares in A. C. Cossor, which were acquired as a result of the purchase and resale of that business carried through by the old management in February, 1938. Underwriting losses incurred by Ismay Industries in connection with the Cossor offer for sale have been written off in the present accounts. The board attaches considerable value to the large holding in A. C. Cossor, and as a result of the decision to retain this interest the radio department and the experimental television section of the group have been closed down. Mr. A. E. Somers, the new chairman and managing director, will deal with the investment losses to be written off and the contemplated capital scheme in his speech at the annual meeting on February 22nd. An extraordinary meeting will be held on March 8th, at which a resolution will be submitted for changing the name of Ismay Industries to Sterling Industries.

The Westinghouse Brake & Signal Co., Ltd., held its annual meeting on February 14th when Mr. H. G. Brown (deputy chairman) who presided, said that the gross profit for the year under review constituted a record in the history of the company. The new buildings at their Chippenham factory were now in use and the benefits of the improvements were being realised. As a direct result of this policy the output capacity of their factory had increased by over 100 per cent. in the last three years, and during the last twelve months had reached peak figures; these were reflected in the record gross profit for the year. The Polish contract was being carried forward to completion. They had made more than 86 per cent. of the deliveries, and the whole contract was dated for completion in April, 1940. They had also completed 67 per cent. of the Lithuanian brake contract. In spite of record productions of goods per month, the orders on hand on October 1st were only slightly less than in the previous year. Since that date the inflow of orders had decreased from the extraordinarily high level, but they still had a large amount outstanding, and, as a result, the plant would be kept busy for many months to come. Capt. L. H. Peter (managing director) said that the biggest orders that they had on hand at the present time were in connection with the important extensions in progress on the London Transport system. They were also carrying out important contracts for the London and North-Eastern Railway, including the entire resignalling of York station, which would take at least two years.

The Yorkshire Electric Power Co. reports a net profit for 1938 of £602,947, as compared with £569,180 in the preceding year, to which is added £95,115 brought in, making £698,062. The dividend on the ordinary stock for the year is maintained at 8 per cent. by the final distribution of 5 per cent. Depreciation and reserve funds receive £280,000, plant renewals fund £105,000 and £97,462 is carried forward. The sales of electricity to the company's consumers totalled 438.0 million kWh (against 415.5 million kWh in 1937) and to the Central Electricity Board 126.6 million kWh (against 136.2 million kWh). Contracts for further supplies of electricity to new and existing consumers have been entered into, and the company's distribution system has been extended to provide for the growing demands. Substantial progress has been made with the extensions at the Ferrybridge power station and the first section of the new plant should be available for use at an early date. The Yorkshire Waste Heat Co., Ltd., was wound up during the year and the resultant assets of £47,051 were transferred to the Power Co. The North Lancashire and Howdenshire Electricity Co., Ltd., has made satisfactory progress, and the dividend of 3½ per cent. on the ordinary shares for 1937 is included in the Power Co.'s 1938 revenues. The issue of 3¼ per cent. debenture stock amounting to £481,500 in January, 1938, exhausted the company's statutory borrowing powers, and so as to provide for further developments the directors have now decided to make an issue of ordinary shares by proportionate allotment to existing preference and ordinary stockholders, of which particulars will be circulated shortly. Meeting: February 20th at Leeds.

Underwriting has been completed for the issue of 824,600 £1 ordinary shares at 30s. each in the proportion of one for every five held by existing ordinary and preference stockholders.

The English Electric Co., Ltd.—The preliminary figures relating to this company, which were given in our last issue, are confirmed by the report for the year ended December 31st, which has now been issued. The profit for the year is £667,603, as compared with £552,185 for 1937, and after meeting debenture interest, fees, depreciation, and reserve for N.D.C. and income tax, the amount earned for dividends is £501,709 (against £446,185). The ordinary dividend for the year is maintained at 10 per cent., general reserve again receives £200,000, and £70,554 is applied to writing off debenture issue expenses (against £10,000). The balance carried forward is £67,265 (against £54,287 brought in). As we have already announced, the directors have decided to issue part of the unissued capital of the company in the form of ordinary shares at par and to offer these to ordinary stockholders in the proportion of one new share for each £3 of ordinary stock. The report states that, without taking into account important contracts for direct armament work, the company in 1938 had the largest turnover and the largest sales, and entered on the current year with the largest order book in its history. The margin of profit obtainable in recent months in the home market has been slightly lower, and prices in export markets are on a very low level. Meeting: February 21st.

The Rawlplug Co., Ltd., reports a net balance for 1938 of £57,997, as compared with £64,311 for 1937. The final ordinary dividend is 30 per cent., again making 40 per cent. for the year; reserve receives £5,000, and £22,245 is carried forward (against £21,997 brought in).

The Northampton Electric Light & Power Co., Ltd., has declared a final dividend of 6 per cent. actual on the ordinary stock, making 10 per cent. for the year (same), plus a cash bonus of one per cent. actual in recognition of the company's fiftieth year. The net profits for 1938 were £124,511 (subject to audit), as compared with £117,836 in 1937.

The Rushden & District Electric Supply Co., Ltd., is paying a final dividend of 5 per cent. actual, less tax, making 9 per cent. for the year (unchanged). The net profit for 1938 was £15,007 (subject to audit), as against £11,693 in the preceding year.

Edmundsons Electricity Corporation, Ltd., reports that the operations of its group of companies during January, as compared with the corresponding month of 1938, show an increase of 20 per cent. in kWh sold.

The Electrical Distribution of Yorkshire, Ltd., has declared a final dividend of 4½ per cent., making 9 per cent. for the year (same).

The Brentford Electric Supply Co., Ltd., reports a trading profit for 1938 of £15,302, as compared with £18,321 in the preceding year, to which is added £667 brought in. The ordinary dividend for the year is 7 per cent. (against 8 per cent.), free of tax, and £858 is carried forward.

The Chesham Electric Light & Power Co., Ltd., reports a profit of £23,249 for 1938, as compared with £29,572 in 1937, plus £895 brought in. The ordinary dividend is 7 per cent. (against 8 per cent.), and £15,750 is carried forward.

The Egham & Staines Electricity Co., Ltd., reports a profit for the year ended December 31st of £82,405, as compared with £86,114 for the previous year, plus £1,710 brought in. The ordinary dividend for the year is 7 per cent., tax free, and £46,200 is carried forward. The dividend for 1937 was 7 per cent., but was paid on smaller capital.

The Chipping Norton Electric Supply Co., Ltd., which is controlled by the Egham and Staines Electricity Co., reports a profit for 1938 of £2,046, as against £1,996 for the previous year, to which is added £100 brought in. Interest on loans absorbs £426, depreciation £1,618 and £102 is carried forward.

The Slough & Datchet Electric Supply Co., Ltd., reports a profit for 1938 of £51,928, as compared with £47,682 in the preceding year, which with £1,221 brought in and £414 interest on loans, &c., makes £52,734 available. The ordinary dividend for the year is 8 per cent., and £1,026 is carried forward. The dividend for 1937 was 8 per cent., but was paid on smaller capital.

The Notting Hill Electric Lighting Co., Ltd., reports a net revenue for 1938 of £51,126, as compared with £66,354 in the preceding year, to which is added £12,614 brought in, £62 dividend on investment, and £1,688 from No. 2 reserve, making £65,491. The dividend on the ordinary capital for the year is 5 per cent. (against 8.0646 per cent.), and £1,594 is carried forward.

Mather & Platt, Ltd., report a net profit for 1938 of £212,449, as compared with £209,786 for 1937. The dividend for the year is maintained at 13½ per cent., by the final payment of 9½ per cent.

Strand Electric Holdings, Ltd., announces an interim dividend of 4 per cent., less tax (same).

Waygood-Otis, Ltd., report a net profit for 1938, after placing £10,000 to pensions, of £136,776, as compared with £126,261. The final dividend is 12½ per cent., making 25 per cent. for the year (same), plus a special bonus of 20 per cent. (same). The balance carried forward is £10,555 (against £13,279 brought in).

The Mid Southern Utility Co., Ltd., has declared a final dividend of 2 79/80 per cent., less tax, on the "A" consolidated stock, making 5 39/40 per cent. for the year (against 6⅛ per cent.), 2 19/80 per cent., less tax, on the "B" consolidated stock, making 4 19/40 per cent. (4⅜ per cent.), and 2½ per cent., less tax, on the "C" consolidated stock, making 5 per cent. for the year (same).

The Power Securities Corporation, Ltd.—Presiding at the annual meeting held on Wednesday last, Mr. G. Balfour (chairman) said that work on the Tigris Barrage had been completed and they were now engaged on other work in Iraq. They had completed and still had in hand a considerable volume in many parts of this country, including a fair amount in hand in the London area, in addition to miscellaneous work in progress in several parts of the world. They had still £1¾ millions of new work current at the end of the financial year. There was no reason why this year should not maintain their record of the past.

Stocks and Shares

TUESDAY EVENING.

THE prevailing condition of Stock Exchange markets can best be described as one of almost complete tranquillity. The volume of business in stocks and shares has shrunk to a great extent, as compared with that of even a week ago. The prospect of an early termination to the Spanish civil war—at one time thought likely to bring about a better state of affairs in markets—is now regarded as a possible precursor to fresh political complications on the Continent. With this in view, investment and speculation are chary of venturing far into any of the markets, with the result that many prices, as is usual in quiet times, show a disposition to dwindle.

The English Electric Company has issued the best report of its life, showing handsome improvements in profit and in the general position of the company. An offer of one new share at par, 20s., for every £3 of ordinary stock held is contemplated. The present shares stand at 34s. 6d. The Yorkshire Electric Power Company is also offering new ordinary shares of £1 each at 30s. The price of the old shares is 36s. 6d.

Although new issues are comparatively few and far between, those which do venture into the open appear to have little difficulty in finding support, in such cases as those where good security is offered at a reasonable figure.

Home Railway Dividends

Three of the four main-line Railway Companies have now announced their dividend decisions in respect of 1938—a year characterised by heavily falling traffics and ending up with the springing of the "square deal" claims. Profits compare poorly with those of 1937, but the Southern and the L.M.S., with announcements of full dividends on the 5 per cent. preferred and the 4 per cent. first preference respectively, took the blithest optimists by surprise: Southern preferred was promptly marked up 10 points, and the whole market moved on to higher ground. This week the G.W.R. has spoilt the picture to some extent in declaring a mere ½ per cent. on the ordinary stock—and that only by drawing on reserves; there had been fairly confident expectation that the dividend would be made up to the 3 per cent. payment, which would keep the prior charges in the full trustee list. Prices fell back on this result, but, sustained by the encouraging "square deal" news, still show advances over the past fortnight. The L.N.E.R. dividend will complete the set of Friday of this week.

Southern Railway Preferred

Economies effected in working costs have contributed handsomely to the two unexpectedly good home railway profits and dividends. On the Southern, railway expenditure rose by £456,000 in the first half of the year—but by a mere £38,000 in the second half. It is supposed that the extensive electrification of the lines has had a considerable influence. The report states, indeed, that electric trains ran 4¼ million miles more than in 1937, while the steam train mileage was down by 2¾ millions. In effect, the report shows the surprise 5 per cent. dividend on the preferred stock to have been short-earned by about ¼ per cent. During the past week the price of the stock has lost 3 points of the previous sharp improvement. At 63½ the yield is over 8¼ per cent. There is a disposition to compare the stock not unfavourably with London Transport "C" stock, at 69½, which yields 5¾ per cent. on the current 4 per cent. dividend.

Electricity Supply

Dealings in the market for electricity shares are hardly active enough to provide a proper test for the current level of prices. This may account for the scarcity of quotable alterations in a week which has seen the development of strength in sections of the industrial markets. It is worthy of note that in the case of County of Londons and Edmundsons, which are among the more active shares, the prices show improvement, even though of small dimensions. The official electricity output return for the first month of the year, it is noted, shows the very substantial rise of 13¼ per cent. over the figures for the previous January. Northampton Electric, Lancashire Light and Power and Yorkshire Electric are among the first in the field with their results for 1938, and have given an encouraging send-off to the season of dividends and reports.

Dealings in the newly issued Yorkshire Electric Power ordinary shares were timed to start on Wednesday in this week. The opening price was estimated in advance as likely to be about 4s. 6d. premium over the 30s. at which shareholders had the right to subscribe the issue.

Electrical Equipment and Manufacturing

Industrial markets have had a reasonably good week so far as prices are concerned, although business tailed off a good deal. In several instances prices have improved over the past fortnight to an extent approaching the spectacular. It is only fair to add that a slight pressure on the part of the buyers has been all that was necessary to produce this result in a market short of floating supplies, and with holders tenaciously refusing to part with stock under the more hopeful circumstances. Electrical equipment shares have been well to the front of the advance, with cable manufacturing shares again prominent. Callender's, at 81s. 3d., have added 3s. 9d. to a gain of 2s. 6d. in the preceding week. Enfields at 2⅞, British Insulated at 4⅝, and Henley's at 20s., have gone similarly from strength to strength. General Electrics have jumped half a crown to 77s., and there are gains of 1s. 6d. in Associated Electricals at 40s., of 1s. in Crompton Parkinsons at 17s. 9d., and of 2s. in Walsall Conduits at 27s.

English Electric

As mentioned above, English Electric has announced the highest profits—and the largest order book—in the company's experience, and is providing for fresh expansion with an issue of ordinary shares on bonus terms. Such criticism as may have arisen over the absence of any advance on the 10 per cent. ordinary share dividend is regarded, under the circumstances, as being somewhat churlish, for the earnings are enough to cover a payment of three times that rate. Shareholders are to be offered one new share in three at a price of 20s., against the market price of 34s. 6d. for the old shares, the rights being worth about 3s. 6d. per share. After deducting the equivalent of dividend and rights, the present price would be approximately 29s. 6d., giving a yield of over 6¾ per cent., a return appreciably higher than on other leading electrical equipment shares. The price has risen 1s. 6d. since publication of the results. It is expected that the letters in respect of the new issue will be available early next week, and that dealings in the new shares will begin on or about February 21st.

Ismay Industries

Shareholders in Ismay Industries had the accounts before them early this week. The statement covers a period of sixteen months ended last October, the difficulties encountered during that time being reflected in a loss of £31,000. The interests in subsidiaries and associated companies still stand in the balance sheet at over £1½ millions. The heavy losses in this account will be dealt with in a reconstruction scheme to be expounded at next week's meeting. The shares remain under 1s., the price to which the 5s. shares are expected, by some people to be written down. The control of the Britannia Electric Lamp Company, which was formerly in the hands of Ismay Industries, passed to members of the E.L.M.A. about two months ago. The 5s. Britannia shares are quoted at 7s. 6d.

ELECTRICAL COMPANIES' SHARES

Prices, dividends and yields

Company.	1938. Highest.	1938. Lowest.	Dividend. Previous.	Dividend. Last.	Price Feb. 14.	Rise or Fall.	Yield p.c. £	s.	d.
Home Electricity Companies									
Bournemouth and Poole ...	68/3	62/–	15	15	67/6	+1/6	4	9	0
British Power & Light ...	30/9	24/6	6	7	27/6	—	5	1	10
City of London	34/6	28/6	7½	7½	32/–	—	4	13	9
Clyde Valley	42/6	33/–	8	8	36/3	+6d.	4	8	6
County of London ...	51/9	38/9	10½	10½	44/6	+6d.	4	14	5
Edmundson's :									
7% Pref....	33/3	30/–	7	7	30/–	—	4	13	4
Ord.	40/9	18/9	9	9	25/6	+1/–	—		
Elec. Dis. Yorkshire ...	43/6	37/9	9	9	40/–	+6d.	4	10	0
Elec. Fin. and Securities...	51/9	49/–	12½	12½	46/3	—	5	8	3
Elec. Supply Corporation...	55/–	50/–	12	12	48/9	—	4	18	4
Isle of Thanet	21/3	18/6	4	4	20/–	—	4	0	0
Lancs Light and Power ...	35/–	26/–	7½	7½	30/9	+9d.	4	17	7
Llanelly Elec.	23/6	21/–	5½	5½	21/6	—	5	2	4
Lond. Assoc. Electric ...	32/9	28/–	7	7	28/9	—	4	17	4
London Electric	36/3	32/–	7	7	33/–	—	4	4	10
London Power Deb. Red.	108¾	100	5	5	104½	—	4	15	6
Metropolitan	51/–	41/–	10	12	46/3	—	5	4	1
Midland Counties	39/9	33/–	8	8	35/–	—	4	11	6
Mid. Elec. Power	41/9	37/–	8	9	38/9	—	4	12	10
Newcastle Elec.	31/9	27/6	7	7	28/9	—	4	17	4
North Eastern Electric :									
Ordinary...	34/–	25/–	7	7	30/6	+6d.	4	11	10
7% Pref....	34/–	30/–	7	7	30/–	—	4	13	4
Northampton	47/6	43/9	10	10	45/–	—	4	9	0
Notting Hill 6% Pref. (£10)	14½	13½	6	6	13½	—	4	12	4
North Met. Elec. :									
Ordinary...	49/–	43/–	10	10	43/9	—	4	11	5
6% Pref....	30/6	28/3	6	6	28/–	—	4	5	9
Richmond Elec.	30/6	28/–	7	7	28/9	—	4	17	5
Scottish Power	38/9	32/–	8	8	35/–	—	4	11	6
Southern Areas	22/9	18/6	4½	5	20/–	—	5	0	0
South London	32/6	31/–	7	7	31/6	—	4	9	0
West Devon	23/3	21/3	5	5	1⅛	—	4	9	0
West Glos....	19/–	16/9	2	2	20/–	—	2	0	0
Yorkshire Elec.	42/–	36/9	8	8	36/6	−6d.	4	7	6
Overseas Electricity Companies									
Atlas Elec.	4/6	2/6	Nil	Nil	2/6	—	—		
Calcutta Elec.	44/3	36/3	12*	10*	38/3	—	5	4	7
Cawnpore Elec.	40/–	35/–	10	10	31/3	−1/9	6	7	10
East African Power ...	28/3	22/6	7	7	23/9	—	5	18	0
Jerusalem Elec.	26/9	23/3	5	6	24/–	—	5	0	0
Kalgoorlie (10/–)	12/–	9/6	7½	7½	10/3	—	7	6	4
Madras	34/6	28/9	8*	8*	30/–	—	5	6	8
Montreal Power	31¾	26¾	1½	1½	32½	+½	—		
Palestine Elec. "A" ...	31/9	27/–	7½*	7½*	27/6	—	5	9	1
Perak Hydro-electric ...	25/3	17/–	7	6	17/6	—	6	17	2
Shawinigan Power ...	23½	16½	85cts.	83cts.	22	−1	—		
Tokyo Elec. 6%	65½	39	6	6	57½	+1	10	8	8
Victoria Falls Power ...	76/3	55/–	12	13½	66/3	—	4	1	7
Whitehall Investments Pref.	22/3	15/–	7½	7½	17/6	+1/6	8	11	6
Public Boards									
Central Electricity :									
1950–70	115¾	97	5	5	108½	—	4	12	2
1955–75	118½	100	5	5	112½	—	4	9	0
1951–73	111	95	4½	4½	104	—	4	3	4
1963–93	101	85	3½	3½	92½	—	3	14	10
London Elec. Trans. Gtd.	93½	88	2½	2½	87	+½	2	17	1
London & Home Counties,									
1955–75	112¾	97½	4½	4½	107	—	4	4	1
Lond. Passenger Transport :									
A...	119½	104¾	4½	4½	111½	+2	4	0	9
B...	122¾	105	5	5	111½	—	4	9	8
C	84	68	4½	4	69½	—	5	15	0
West Midlands Joint Elec.,									
1948–68	115¼	102½	5	5	112	—	4	9	3
Telegraph and Telephone									
American Tel. & Tel. ...	160	114	9	9	167½	—	5	7	9
Anglo-Am. Tel. :									
Pref.	115½	100½	6	6	100½	+1	6	0	0
Def.	28	23	1½	1½	22½	−½	6	13	4
Anglo-Portuguese	23/6	19/3	8	8	21/3	+1/6	7	10	7
Cable & Wireless :									
5½% Pref.	104	76½	4½	5½	82½	—	6	13	4
Ord.	67¾	34	—	4	40½	−1	10	0	0
Income	102½	99	—	—	100	—	4	0	0
Canadian Marconi $1 ...	6/6	3/9	—	Nil	4/9	—	—		
Globe Tel. & Tel. :									
Ord.	32/6	26/3	5½*	7½*	26/3	+1/6	5	14	3
Pref.	27/6	23/9	6	6	26/3	—	4	11	5
Great Northern Tel. (£10)...	42½	34	20	20	36½	—	5	9	7
Inter. Tel. & Tel.	12½	5½	Nil	Nil	9½	—	—		
Marconi-Marine	30/6	21/6	10%	7½	24/6	—	6	2	4
Oriental Telephone Ord. ...	59/3	2½	12*	12*	2⅞	−⅛	4	18	3
Radio Corpn.	9½	4¾	8	6	7½	−½	—		
Telephone Props	13/9	11/3	5	6	13/9	—	8	14	6
Telephone Rentals (5/–) ...	10/–	7/6	5	6	9/–	—	3	6	8
Western Union	34½	17	2½	—	23½	—	—		
Traction and Transport									
Anglo-Arg. Trams :									
First Pref.	11/–	2/6	Nil	Nil	3/9	—	—		
4% Inc.	31	8	Nil	Nil	10	+2	—		
British Electric Traction :									
Def. Ord.	1060	675	5	6	875	—	—		
Pref. Ord.	175	150	8	8	160	—	5	0	0
Bristol Trams	45/–	34/3	5	8	43/9	+¾	3	13	1
Brazil Traction	14½	7⅛	$1	—	9½	−⅛	—		
Calcutta Trams	26/9	21/6	8	8	24/6	—	6	10	8
Cape Elec. Trams	18/6	15/6	5	6	17/6	—	6	17	2
Lancs Transport	35/3	29/3	10	10	35/–	−9d.	5	14	3
Mexican Light :									
1st Bonds	39	16½	5	5	25	—	—		
Rio 5% Bonds	91	47	5	5	57	+2	8	15	6
Southern Rly :									
5% Prefd.	87	48	5	—	60½	−3	8	6	0
5% Pref.... ...	116	83	5	5	89½	+1	5	11	9
T. Tilling	60/–	36/6	10	10	2⅜	+¼	4	4	3
Tilling & B.A.	57/–	46/–	10	9*	50/–	—	3	12	0
West Riding	46/3	30/6	10	10	33/9	+1/6	—		
Equipment and Manufacturing									
Aron Electricity Ord. ...	40/3	31/–	15	15	1½	—	10	0	0
Assoc. Elec. :									
Ord.	45/3	32/–	10	10	40/–	+1/6	5	0	0
Pref.	38/9	35/6	8	8	35/6	−6d.	4	10	0
Automatic Telephone & El.	43/–	35/–	5	10	40/–	—	5	0	0
Babcock & Wilcox ...	44/–	32/6	10	10	40/–	+½	5	0	0
British Aluminium Ord. ...	54/–	40/–	10	12½	54/3	—	4	11	9
British Insulated Ord. ...	95/9	77/–	20	20	4⅝	+⅛	4	12	10
British Thermostat (5/–) ...	16/–	9/–	17½	18½	14/6	+9d.	6	7	6
British Vacuum Cleaner (5/-)	35/9	27/–	40	40	22/–	—	—		
Brush Ord.	5/6	4/9	Nil	Nil	5/–	+3d.	—		
Callender's	5½	78/6	20	20	81/3	+⅜	4	18	6
Chloride Elec. Storage ...	77/9	61/–	15	20	75/–	—	5	6	8
Consolidated Signal ...	116/–	75/–	32½	36½	92/–	+2/–	7	18	8
Crabtree (10/–)	29/–	22/–	17½	17½	22/6	—	7	15	7
Crompton Parkinson :									
Ord. (5/–)	32/3	18/9	12½	15	17/9	+1/–	—		
E. K. Cole (5/–)	8/9	4/6	5	10	6/–	—	8	6	8
Elec. & Musical Industries									
(10/–)	16/3	9/–	10	5	11/–	+3d.	4	11	0
Electric Construction ...	36/–	31/–	10	12½	32/6	−⅛	7	14	0
Enfield Cable Ord. ...	5⅛	46/–	25	25	2¾	+¼	—		
Electrical Switchgear (10/–)	27/–	22/6	16	16	26/3	—	6	2	0
English Electric	33/–	24/6	10	10	34/6	+1/6	5	1	6
Ensign Lamps (5/–) ...	14/3	11/3	—	25	14/–	—	8	18	6
Ericsson Tel. (5/–) ...	2⅛	31/–	25*	25*	37/6	--	3	6	8
Ever Ready (5/–)	26/3	16/6	45	35	22/–	—	7	19	2
Falk Stadelmann	34/3	27/–	10	10	27/6	—	7	5	6
Ferranti Pref.	27/6	25/–	7	7	25/–	—	5	12	0
G.E.C. :									
Pref.	34/–	31/3	6¼	6¼	31/3	—	4	3	2
Ord.	79/3	67/–	17½	20	77/–	+½	5	4	0
Greenwood & Batley ...	27/6	19/–	7	15	26/3	—	11	8	2
Hall Telephone (10/–) ...	24/6	18/3	5	15	20/–	—	7	10	0
Henley's (5/–)	21/–	16/–	15	20	20/–	+1/6	5	0	0
4½% Pref.	23/–	22/–	4½	4½	22/6	—	4	0	0
Hopkinsons	40/–	32/6	10	12½	37/6	—	6	13	0
India-Rubber Pref. ...	21/9	20/3	5½	5½	21/3	—	5	3	6
Intl. Combustion	5/8	4¼	32½	32½	5½	+¼	6	3	10
Ismay Industries (5/–) ...	6/9	1/–	6	6	10½d.	—	—		
J. Lucas	57/9	47/6	15	15	57/6	+½	5	4	4
Johnson & Phillips ...	43/9	32/6	10	12½	33/9	—	7	8	0
Lancashire Dynamo ...	72/3	53/–	20	25	62/6	—	8	0	4
Laurence Scott (5/–) ...	12/–	9/–	7	15	10/6	—	7	2	10
London Elec. Wire ...	35/–	28/3	12	7½	29/6	—	5	1	8
Mather & Platt	49/–	41/3	13½	13½	45/–	—	6	0	0
Metropolitan Elec. Cable Pf.	22/–	21/–	5½	5½	21/3	—	5	3	6
Murex	93/9	66/3	20	20	76/3	+1/6	5	5	0
Pye Deferred (5/–) ...	12/–	8/–	5	25	8/9	+9d.	14	5	8
Revo (10/–)	36/3	30/–	12	17½	35/–	+1/6	5	0	0
Reyrolle	62/6	49/–	12½	12½	53/9	—	4	13	0
Siemens Ord.	31/–	20/6	7½	7½	21/3	—	6	13	4
Strand Elec. (5/–) ...	6/–	4/–	5	10	5/–	—	10	0	0
S. Smith (1/–)	9/9	6/3	37½	50	7/6		6	13	4
Switchgear & Cowan (5/–)	19/6	12/6	20	20	15/–	—	6	13	4
Telegraph Condenser (10/–)	18/9	12/–	5	5	10/–	—	5	0	0
Telegraph Construction ...	2½	36/–	7½	10	2½	—	4	14	1
Telephone Mfg. (5/–) ...	9/9	7/–	9	9	8/6	—	5	6	0
Tube Investments... ...	89/6	70/–	23¾	23¾	87/–	+2/–	5	9	2
Vactric (5/–)	9/9	4/6	10	4	3/3	—	6	3	2
Vickers (10/–)	27/–	17/6	10	10	22/6	+6d.	4	9	0
Westinghouse Brake ...	63/9	45/–	17½	17½	50/–	—	7	0	0
Walsall Conduits (4/–) ...	26/–	22/6	—	55	27/–	+2/–	8	3	0
West, Allen (5/–)	6/6	4/6	—	7½	6/–	—	6	5	0

* Dividends **are paid free** of Income Tax.

NEW PATENTS

Electrical specifications recently published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1937

10908. "Band-filter coupling circuit for television amplifiers." Radioakt-Ges. D. S. Loewe. April 16th, 1936. (499132.)

13332/13844. "Telephone installations." C. Lehner, M. Gadesmann, K. Leichthammer and H. Leichthammer (trading as Telefonbau und Normalzeit Lehner and Co.). May 8th and 18th, 1936. (499133/499135.)

16597. "Means for controlling the connection between the voltage tappings and the output terminals of electric transformers." R. I. Bagnall and Foster Engineering Co., Ltd. June 15th, 1937. (499197.)

16613. "Radio signalling systems." Wallace and Tiernan Products. June 20th, 1936. (499028.)

17793. "Electric plugs and sockets." J. S. Highfield, M. J. Highfield and M. E. Highfield (legal representatives of W. E. Highfield, dec.), A. Reyrolle and Co., Ltd., and O. Robson. June 25, 1937. (Cognate application 27843/37.) (499199.)

19537. "Electric wave selecting device." Standard Telephones and Cables, Ltd. July 18, 1936. (499142.)

19643. "Systems of voltage amplification." British Thomson-Houston Co., Ltd. July 15th, 1936. (499206.)

19728. "Electric lamp fittings." S. W. Hamlyn. July 16th, 1937. (499147.)

19739. "Printing-telegraph systems and apparatus." Creed and Co., Ltd., and F. P. Mason. July 16th, 1937. (Cognate application 28869/37.) (499209.)

19791. "Electric-discharge apparatus." Soc. Anon pour les Applications de l'Electricité et des Gaz Rares Etablissements Claude-Paz and Silva. June 1st, 1937. (499032.)

19810. "Selecting and printing apparatus for use in telegraph circuits." E. E. Kleinschmidt. Aug. 13th, 1936. (499033.)

19812. "Electric protective arrangements." A. Reyrolle and Co., Ltd., and H. Leyburn. July 16th, 1937. (499310.)

19872. "Electric cables." Felten and Guilleaume Carlswerk Akt.-Ges. September 3rd, 1936. (499212.)

19935. "System for the transmission of electrical energy to or from a submerged body or other structure." A. Graham and Co., Ltd., and C. H. Vaughan. July 19th, 1937. (Cognate application 25015/37.) (499037.)

19954. "Electric cable." General Cable Corporation. August 8th, 1936. (499311.)

20030. "Electric tumbler switches and covers." A. Watson. July 20th, 1937. (499314.)

20086. "Electron-discharge device circuit arrangements for use on very high frequencies." Marconi's Wireless Telegraph Co., Ltd., and G. B. Banks. July 20th, 1937. (499218.)

20087. "Tuning-control systems for radio receivers and the like." Marconi's Wireless Telegraph Co., Ltd., N. M. Rust, and E. F. Hills. July 20th, 1937. (498927.)

20144. "Thermionic amplifiers." Standard Telephones and Cables, Ltd., B. B. Jacobsen, and A. H. Roche. July 21st, 1937. (499315.)

20145. "Means for cooling electron-discharge devices." Standard Telephones and Cables, Ltd., and W. R. Moscrip. July 21st, 1937. (499316.)

20146. "Electric wave signalling systems." Standard Telephones and Cables, Ltd., K. G. Hodgson, and W. N. Roseway. July 21st, 1937. (499317.)

20257. "Construction and arrangement of electric water-heating apparatus." A. McDonald and H. Webb and Co. (Engineers), Ltd. July 21st, 1937. (Cognate Application 25055/37.) (498928.)

20266. "Position-finding radio apparatus." O. G. E. Roberts. July 21st, 1937. (499383.)

20324. "Polyphase watthour meter construction." Sangamo Electric Co. April 12th, 1937. (499328.)

20327. "Alternating-current electric relays." A. Reyrolle and Co., Ltd., H. Leyburn, and C. Freeland. July 22nd, 1937. (499329.)

20328. "Electric musical instruments." J. Compton Organ Co., Ltd., and L. E. A. Bourn. July 22nd, 1937. (Cognate applications 20329/37 and 20331/37.) (499330.)

20364. "Electro-magnetically operated mechanism arranged for control by perforated records." British Tabulating Machine Co., Ltd. July 23rd, 1936. (499331.)

20447. "Electric resistance heating devices." J. G. A. Rhodin. July 23rd, 1937. (499341.)

20467. "Permanent magnets for magnetos." Soc. Anon Sfruttamento Brevetti Elettro-Meccanici. December 19th, 1936. (499042.)

20475. "Galvanising." T. Liban. July 23rd, 1936. (499149.)

20487. "Electro-deposition of metals." E. I. Du Pont de Nemours and Co., H. J. Barrett, and C. J. Wernlund. July 23rd, 1937. (499343.)

20490. "Electro-magnetic device for liquid-level regulation." W. Stern. July 24th, 1937. (499219.)

20509. "Electric switches for use on alternating-current circuits." J. H. Tucker and Co., Ltd., and F. C. Fuke. July 24th, 1937. (499043.)

21036. "Light-projectors utilising an electric light source." Anciens Etablissements Barbier, Benard, and Turenne. August 11th, 1936. (499221.)

21166. "Piezo-electric crystal mountings." Marconi's Wireless Telegraph Co., Ltd. September 30th, 1936. (499225.)

28508. "Photo-electric apparatus for light analysis." Mullard Radio Valve Co., Ltd., and C. C. Eaglesfield. October 19th, 1937. (499230.)

31332. "Apparatus for the transmission of television and the like." General Electric Co., Ltd., and D. C. Espley. November 15th, 1937. (498945.)

1938

4522. "Arrangement for electrically heating air and other gases to high temperatures." W. Schottky. March 2nd, 1937. (499074.)

5011. "Measuring arrangements for high-frequency currents." Siemens and Halske Akt.-Ges. March 2nd, 1937. (499239.)

6071. "Electric signalling systems comprising concentric cables." Siemens and Halske Akt.-Ges. March 1st, 1937. (Cognate application 6072/38.) (499077.)

7156. "Electro-magnetic interrupters or vibrators." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 9th, 1937. (499079.)

8817. "Wireless receiving sets." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 25th, 1937. (490080.)

11116. "Electric-discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. April 13th, 1937. (499171.)

11220. "Antenna structures particularly for radio direction-finding systems." C. Lorenz Akt.-Ges. April 12th, 1937. (498985.)

11549. "Electric current convertors." Suddeutsche Apparatefabrik Ges. May 14th, 1937. (498986.)

11911. "Dielectric materials." Standard Telephones & Cables, Ltd. April 20th, 1937. (498991.)

12172. "Electrolytic and electrostatic condensers." Mallory Patents Holding Co., Ltd. September 24th, 1937. (499083.)

12387. "Electrical oscillators." Marconi's Wireless Telegraph Co., Ltd. April 23rd, 1937. (499088.)

13374. "Automatic regulation of parallel connected electric generators." Soc. d'Applications et de Fabrications Industrielles. May 4th, 1937. (499102.)

13457. "Alternating-current signalling systems." Standard Telephones & Cables, Ltd. May 14th, 1937. (499103.)

13707. "Apparatus, such as radio receivers, for converting acoustically modulated oscillations into sound oscillations." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. May 10th, 1937. (499108.)

14319. "Alternating-current telegraphy systems." Siemens & Halske Akt.-Ges. May 13th, 1937. (499114.)

14358. "Electric-discharge devices and methods of manufacturing the same." C. Lorenz Akt.-Ges. May 14th, 1937. (499250.)

15132. "Electric lamps." British Thomson-Houston Co., Ltd. May 22nd, 1937. (499120.)

15632. "Electric fuses." British Thomson-Houston Co., Ltd. May 25th, 1937. (499254.)

15645. "Installation for producing high rectified voltages." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. May 28th, 1937. (499255.)

16761. "Cathode-ray tubes and method of manufacturing such tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 7th, 1937. (499266.)

17136. "Carbon electrodes for electric arc lamps." J. W. Droll. June 9th, 1938. (499274.)

17555. "Radio direction finders." Telefunken Ges. für Drahtlose Telegraphie. June 12th, 1937. (498995.)

17671. "Temperature - compensating means for electron tube circuits." C. Lorenz Akt.-Ges. June 18th, 1937. (499279.)

17943. "Electric valve circuits." British Thomson-Houston Co., Ltd. June 16th, 1937. (499280.)

19588. "Electric transformers." British Thomson-Houston Co., Ltd. July 1st, 1937. (499010.)

19753. "Electric welding-apparatus." British Thomson-Houston Co., Ltd. July 3rd, 1937. (499011.)

20555. "Radio receiving apparatus comprising means for facilitating tuning." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. July 14th, 1937. (Addition to 481858.) (499359.)

21631. "Electric fuses." R. Bosch Ges. July 23rd, 1937. (499369.)

TRADE MARK APPLICATIONS

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from February 8th—

Galvia. No. 601966. Class 9 (IV). Electric batteries.—Electric and Musical Industries, Ltd., Blyth Road, Hayes, Middlesex.

Selbon. No. 603386. Class 9 (IV). Electric fuses, batteries and accumulators, wireless telegraphic and telephonic apparatus for use in motor cars and aerials therefor, electric condensers and electric flat irons. No. 603387. Class 11 (IV). Electric lamps, electric lamp bulbs, lamp shades, and electric fans and fires.—The Nera Electrical Co., 327-9, Kennington Road, S.E.11.

Design only of head of Britannia, together with an electric lamp. No. 601635. Class 11 (IV). Electric lamps.—Britannia Electric Lamp Works, Ltd., 14, Sunbeam Road, Park Royal, London, N.W.

Lunar. No. 603270. Class 11 (IV). Electric lamps for vehicles.—Notek Electric Co., Ltd., 230-234, Brixton Road, S.W.9.

Key Industry Duty

THE Board of Trade has received an application under Section 5 (5) of the Finance Act, 1936, for a licence to import free of duty one portable pH meter with quinhydrone and antimony electrodes operating by the potentiometer method and having a range of 0-12 pH. Any representations that a similar instrument is made, or is likely to be made within a reasonable time, in the United Kingdom or elsewhere in the Dominions should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, within one month from February 9th with details of such similar instruments and quoting the reference I.M.206/39.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Barnoldswick.—March 4th. Electricity Department. Oil circuit-breaker, 250-kVA transformer and a four-wire distribution pillar as a complete unit. (See this issue.)

Bath.—March 1st. Corporation. Automatic fire protection equipment at the generating station, Dorchester Street. (February 10th.)

Beckenham.—February 20th. Electricity Department. V.i.r. cables, p.i. cables, meters, conduit and conduit fittings for twelve months. (February 10th.)

Bexhill.—February 28th. Electricity Department. Stores and materials for twelve months. (See this issue.)

Birmingham.—February 22nd. Electric Supply Department. Battery renewals and repairs. (February 10th.)

Blackburn.— February 27th. Electricity Undertaking. Cable, wire and meters for twelve months. (February 3rd.)

Brighton.—March 8th. Waterworks Department. Two electrically driven booster pumps, motors, control gear, &c., at Goldstone Works. Town Clerk, Town Hall (deposit £2 2s.).

Bristol.—March 6th. Electricity Department. Electrical requirements for twelve months. (February 10th.)

Burnley.—February 28th. Gas Department. Electrical brakes for hot coke hoist. (See this issue.)

Clitheroe.—February 25th. Electricity Department. Meters, p.i. cables, conductors, and red fir wood poles for twelve months. (See this issue.)

Dartford.—February 25th. Electricity Department. Five 235-kVA, 10,000/400/230-V outdoor transformers, 1,700 yd. of 0.15 sq. in. and 400 yd. of 0.075 sq. in. low-voltage cable, and fire extinguishers. (See this issue.)

Derbyshire.—March 3rd. Works Department. Cables, lamps and sundry electrical accessories for twelve months. (See this issue.)

Dublin.—February 28th. Minister for Defence. Electrical supplies, excluding electric lamps, for Dublin Military Barracks for twelve months.

March 15th. Electricity Supply Board. Power transformers for twelve months. (See this issue.)

Dumbarton.—February 21st. County Council. Heating work and electrical installation at new county buildings. J. Weekes, county architect, 18, Park Circus, Glasgow, C.3 (deposit £1 1s.).

Dumfries.—February 24th. County Council. Electrical work at twelve houses, workshop, garage, &c., at Marchmount. County Clerk, County Buildings.

February 21st. Town Council. Electrical installations at 208 houses at Lincluden estate. Town Clerk.

Eastbourne.—February 17th. Electricity Department. Fire-fighting apparatus and equipment. (February 10th.)

East Ham.—February 27th. Electricity Department. Stores and materials for twelve months. (February 10th.)

Edinburgh.—March 3rd. Electricity Supply Department. Eight 1,000-kVA transformers. (See this issue.)

Egypt.—CAIRO.—March 12th. Ministry of Public Health. Three indoor and three outdoor 50-kVA transformers. (T. 17662/39.)*

February 25th. Ministry of Public Health. One automatic drilling machine and dust-aspirating plant. (T. 17938/39.)*

March 4th. Municipalities Department. Plant for extension to Port Said power station. (T. 17942/39.)*

Eston.—February 22nd. Electricity Undertaking. High- and low-voltage cable. (February 10th.)

Fife.—February 27th. County Council. Electric lighting in eight houses at Kelty. County Clerk, County Buildings, Cupar (deposit £1 1s.).

Finchley.—February 27th. Electricity Department. Stores and materials for twelve months. (February 3rd.)

Harrogate.—February 20th. Corporation. Materials including electric lamps for twelve months. L. H. Clarke, borough engineer, Municipal Offices.

Hove.—February 28th. Electricity Department. Stores and materials for twelve months. (See this issue.)

Ilford.—February 20th. Electricity Department. P.i. cables. (February 10th.)

India. — NEW DELHI.—March 7th. Table standards, lampshades, lampholders, and locks for twelve months. (T. 18145/1939.)*

Irvine (AYRSHIRE). — February 18th. Town Council. Electric lighting in eighteen houses in Gottries Road and six in Fullarton Street. Town Clerk (deposit £1 1s.).

Kettering.—February 27th. Electricity Undertaking. Extra-high- and low-voltage cables, AC meters for twelve months, and two transformers. (February 3rd.)

Kirkcaldy.—March 11th. Town Council. Electric lighting and power, boiler house plant, central heating, &c., at the new municipal buildings. Town Clerk (deposit £2).

Lanarkshire.—February 18th. County Council. Heating installation and electric lighting at St. Patrick's R.C. School, Shotts. J. Stewart, County Architect, 34, Albert Street, Motherwell.

Littleborough.—March 4th. Electricity Department. P.i., low-voltage cables and AC house service meters for twelve months. (See this issue.)

London.—H.M. OFFICE OF WORKS.—February 23rd. Wiring for lighting and power at Bridgend R.O.F. (February 10th.)

February 21st. Electrical wiring at Pembrey R.O.F. (February 10th.)

February 28th. High- and low-voltage cables and accessories at Pembrey R.O.F. (February 10th.)

HACKNEY.—February 22nd. Electricity Department. Electrical stores and materials for twelve months. (February 3rd.)

POPLAR.—March 3rd. Borough Council. Materials for twelve months. (February 10th.)

STEPNEY.—March 6th. Electricity Supply Undertaking. Extra-high and low-voltage, p.i. cables for twelve months. (See this issue.)

ST. MARYLEBONE.—March 22nd. Borough Council. Portable generating and pumping sets and fire fighting equipment. (See this issue.)

Long Eaton.—February 18th. Electricity Department. Cut-outs, meters, cables and joint boxes for twelve months. (February 3rd.)

Middlesex.—The County Council invites applications from contractors for the addition of their names, as from June 1st, to the County Council's approved list for building and engineering works by March 4th. (February 3rd.)

New Zealand. — WELLINGTON.—Public Works Department. March 28th. Power and control cables and accessories, service and terminal boxes and cable fittings at R.N.Z.A.F. Station, Ohakea. (T. 18463/39.)*

March 28th. Power and control cables and accessories at the R.N.Z.A.F. Station, Whanuapai. (T. 18461/39.)*

May 2nd. 50-kV outdoor switchgear and steelwork. (T.Y. 18465/39.)*

May 23rd. Two bays of galvanised steelwork and switchgear at Waikaremoana Lower power station. (T. 18598/39.)*

March 28. Distribution switchboard for the R.N.Z.A.F. Station, Whanuapai. (T. 18460/39.)*

May 23rd. One 100-ton electric travelling crane. (T. 18454/39.)*

Oban.—March 6th. Burgh Council. Two 500-kW heavy-oil engine and alternator sets, cooling tower and auxiliaries. (See this issue.)

Portland.—March 11th. Electricity Department. Stores and materials for twelve months. (See this issue.)

Reigate.—February 18th. Electricity Department. Electrical stores and materials for twelve months. (February 10th.)

Rhondda.—March 25th. Electricity Department. Stores and materials for twelve months. (February 10th.)

Salford.—February 22nd. Electricity Department. Electric cookers, fires, water heaters and washboilers, aluminium kettles, iron-clad switches and low-voltage sub-station switchgear. (February 10th.)

Sheffield. — March 13th. Electricity Department. Thirty-eight 11,500-V, 5,000-kVA and three 33,000-V, 15,000-kVA reactors. (February 3rd.)

Southampton.—February 17th. Electricity Department. Transformer kiosks, switchgear, cables, stores and materials, domestic apparatus and meters for twelve months. (February 10th.)

Stoke-on-Trent.—March 8th. Electrical Engineer's Department. Extra-high-voltage sub-station switchgear and static transformers for twelve months. (See this issue.)

Sunderland.—February 18th. The Royal Infirmary. Electrical installation in a new ward block and nurses' home. (February 10th.)

Uruguay. — MONTEVIDEO. — February 28th. Electricity Supply and Telephones Administration. 850 combination circuit-breakers. (T. 18051/39.)*

Wakefield.—February 27th. County Council of the West Riding of Yorkshire. Installation of electric lighting in the Skelmanthorpe new senior school and caretaker's house. Clerk of the County Council, County Hall.

Wallasey.—March 14th. Electricity Department. High-voltage cables, transformers, switch pillars and street lighting poles, fittings and mercury vapour lamps. (See this issue.)

Walthamstow.—February 24th. Electricity Undertaking. High- and low-voltage cables for twelve months. (February 3rd.)

Walton and Weybridge. — February 14th. Electricity Department. Stores and materials for twelve months. (February 3rd.)

Wimbledon.—February 20th. Electricity Department. High-voltage, air-insulated, vertical isolation switchgear units. (February 10th.)

Worcester.—February 28th. Electricity Department. Cables, conductors, transformers and meters for twelve months. (February 10th.)

Orders Placed

Accrington.—Health Committee. Accepted. Electrical installation at clinic (£140).—G. V. Stephenson & Sons.

Barrow-in-Furness.—Electricity Committee. Recommended. Switchgear in connection with alterations at Roanhead sub-station (£898).—Ferguson, Pailin.

Crook and Willington.—U.D.C. Accepted. Extensions to the road lighting at Fir Tree, Crook.—F. Reid, Ferens & Co.

Dublin.—Corporation. Accepted. Installation of regulating machinery at the intake works at Liffey hydro-electric scheme (£3,271).—Glenfield & Kennedy.

Easington.—County Council. Accepted. Discharge lighting and general improvements of road lighting.—F. Reid, Ferens & Co.

Eastbourne. — Electricity Committee. Recommended for twelve months. P.i. cables.—Britannic Electric Cable & Construction Co.; Scottish Cables. Low-voltage joint boxes.—Callender's Cable & Construction Co. Cut-outs and fuses.—W. Lucy & Co. Street lamp standards.—Revo Electric Co.; Bromford Tube Co. Switchgear.—Ferguson, Pailin. Wiring for hired and hire-purchase apparatus and assisted wiring installation.—K. R. Mathews.

London.—L.C.C. — Accepted. Electric lighting at further tenements on the Springfield estate, Wandsworth (£270).—A. Meckhonic. Two electrically driven hydraulic pumping sets at the Northern Outfall Works (£1,061).—Hayward-Tyler & Co. Wiring and fittings for electric lighting at Stanley Street school (£831).—Jacob, White & Co.

DEPTFORD.—Education Committee. Accepted. Electric lighting at Stanley Street school (£831).—Jacob, White & Co.

Manchester. — Housing Committee. Accepted. Electrical installations at 248 flats at Miles Platting.—E. M. Evans & Son.

Electricity Committee. Accepted. Water heaters.—Heatrae; Aidas Electric; Ferranti; Archibald Low Electrics; Hotpoint Electric Appliance Co.

Sheffield.—Health Committee. Accepted. Portable electro-cardiograph (£205).—Cambridge Instrument Co.

Stretford.—Highways Committee. Revised tender. Lighting equipment for street lighting (£8,907).—Met.-Vick. Electrical Co.

Sunderland.—Town Council. Accepted. Installation of electric lighting at the Commercial Road senior school extension (£624).—F. Reid, Ferens & Co.

West Hartlepool.—Town Council. Accepted. Sheet steel kiosk sub-station and transformer.—Electric Construction Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Market and underground car park, for T.C. (£30,500); borough surveyor. School, Plantation Road, for the E.C.

Albrighton.—Houses (170), near Bowling Green Lane; M. W. Maisonettes.

Alloa.—Extensions to Harland Engineering works, Caledonian Road; the manager.

Barnsley.—Houses (58), Burton Road estate; Robertshaw Bros. Houses (176), Park estate; borough engineer.

Barrow-in-Furness.—Houses (27), near Jesmond Avenue; A. Peet. Central police station, Abbey Road; borough engineer. School; Lancaster R.C. Diocesan Schools Commission.

Bewdley.—School; A. V. Rowe, architect.

Birmingham.—Reconstruction of Aston Hippodrome (£30,000); S. H. Newsome, managing director of Coventry Hippodrome, Ltd.

Blackpool.—Development of Cowperthwaite estate; C. W. Cardwell.

Bradford.—Central children's home (£30,000), and extensions to technical college (£29,000); city engineer and trade contractors.

Bredbury.—Houses (70), Harrytown and Cherry Tree estates; U.D.C. surveyor.

Burnley.—Houses (38), Woodstock site and 44, Longsdale Street, for T.C.; J. L. Beckett, borough surveyor.

Carlisle.—Houses (150), Belah estate; John Laing & Sons, Ltd. Schools, for the managers of St. Patrick's; L. Barnish, architect, 58, Rodney Street, Liverpool.

Cheltenham.—Houses (58), near Brooklyn Road; Pye Bros. Houses (288), Hampton Villa Farm, Shurdington Road; Major Dugdale. Houses (53), Prestbury Court estate; L. W. Barnard & Partners.

Cockermouth.—Houses (60); U.D.C. surveyor.

Consett.—Houses (118), Medomsley, and recreational centre for the U.D.C., Sherburn Park (£45,000); U.D.C. surveyor.

Coventry. — Houses (43), Harewood Road; Spring & Phillips, builders, 34, Bedford Street. Houses (21), Sullivan Road; Lucas Bros., builders, 100, Nunts Lane. Cinema at the rear of Empress Buildings, Binley Road; R. Satchwell, architect, 6, New Street, Birmingham.

Cumberland.—Two schools, Cleator Moor, for the E.C.; J. H. Haughan, county architect, County Offices, Carlisle.

Dudley.—Houses (28) and flats (4), Pitfield Row, and alterations to 275 houses, Brewery Fields estate; Joseph Webb. Catholic school, Burton Road; G. Bernard Cox, architect, Birmingham. Police and fire stations (£44,827); J. M. Tate & Son, Ltd.

Dumbarton.—County buildings (electrical work), Dumbuck; J. Weekes, county architect, 18, Park Circus, Glasgow, C.3.

Dunfermline.—Fifteen factories, &c.; trading estate; Hay and Robertson, Ltd., St. Margaret's works, Dunfermline.

Edinburgh.—Reconstruction of Edinburgh Dental Hospital (£55,000); governors.

Eire.—(WATERFORD).—County hospital; McDonald & Dixon, architects, 20, Ely Place, Dublin.

Epsom.—Extensions to county hospital (£80,000); Grace & Marsh, Ltd.

Falkirk.—Shops, offices, garage, &c., High Street (£20,000), for Falkirk Car Park, Ltd.; L. Blakey, architect, Falkirk.

Gateshead.—Houses, Shipcote estate; S. Thompson, builder, Ashtrees Gardens.

Harrogate.—Improvements to Royal Baths (£17,481); borough engineer.

Hebburn-on-Tyne.—Four stores and shelters to Reyrolle and Co.'s works; Cackett, Burns Dick and Mackellar, architects, 21, Ellison Place, Newcastle-on-Tyne.

Heckmondwike.—Schools, Dale Lane, and Sunnyside; N. R. Paxton and R. S. Shapley, respective architects.

Hemel Hempstead.—Extensions to Apsley paper mills, for J. Dickenson & Co.

Hertfordshire.—Technical college, Watford, for the E.C.; Lanchester, Lodge & Davis, architects, 19, Bedford Square, London, W.C.1.

Kettering.—Factory, Bath Road; Gotch, Saunders & Surridge, architects, Bank Chambers.

Lanarkshire.—School, Blantyre; architect, County Council, Hamilton.

Lancashire.—School, Rishton, for the County E.C.; T. Croft & Sons, contractors, Blackpool Road, Holme Slack, Preston.

Leicester.—School, Humberstone; J. O. Thompson, surveyor to Education Committee, Newarke Street, Leicester.

London. — (BELLINGHAM). — School (£31,588); L.C.C. architect, County Hall, Westminster Bridge Road, S.E.1. (ISLINGTON).—Flats, Hilldrop Road; L.C.C. architect.

Loughborough.—Houses, Shelthorpe estate and Hathern; borough engineer.

Luton.—Extensions to technical college; S. C. Jury, architect, Shire Hall, Bedford.

Maidstone.—Houses (90), Coombe Farm estate; borough engineer. Offices for borough treasurer, Tonbridge Road (£7,500); Cox Bros., builders.

Manchester.—Houses (30), Carr Bank Avenue, Merrington Close and Blackley New Road, Blackley, for Emerson Carr, Ltd., 11, Arch Red Bank, Manchester, 4; Roberts Wood & Elder, architects, 26, King Street, Manchester. Factory, Harper Road, Northenden; A. H. Brotherton, architect, 39, Oxford Road, Manchester.

Mansfield.—Extensions to Technical college (£68,558); H. Baggaley, Ltd.

Margate.—Civic centre, Hartsdown Park, for T.C.; A. F. B. Anderson, architect, 13, Manchester Square, London, W.1.

Middlesbrough.—Extensions to works, for the Tees-side Bridge & Engineering Co., Ltd.

Motherwell. — Cinema, Wishaw (£30,000); G. Green, cinema proprietor, 182, Trongate, Glasgow.

Newburn-on-Tyne.—Fire station, Walbottle; U.D.C. surveyor.

Newcastle-on-Tyne.—Houses (13), Sherfield Drive; F. E. Maughan, builders, Red Hall Drive. Stores, at the rear of Northumberland Street; Norman, Jones and Rigby, architects, Southport.

Northumberland.—School, Cramlington (£18,000); W. W. Tasker, County Hall, Newcastle-on-Tyne.

Nottingham.—Flats and houses, Broxtowee estate; city engineer. County hall (£274,472); William Moss & Sons, Ltd. School, Wollaton, for the E.C.

Nottinghamshire.—Library, Kirkby-in-Ashfield (£4,571), for the County E.C.

Oakham (RUTLAND). — Cinema, to be known as the "Trocadero," High Street; W. B. Cole, Leicester.

Oldbury.—Shops and flats, Hagley Road; E. Lottery.

Pewsey.—Houses (30), Salisbury Plain; R.D.C. surveyor.

Portsmouth. — Factory, 88-92, King's Street; A. Hooker.

Reading.—Municipal offices; borough surveyor.

Romney Marsh.—Houses (480), St. Mary's; R. P. Petty, Addington, Surrey.

Ruddington (NOTTINGHAMSHIRE). — Cinema, Clifton Road; M. Nepolsky.

Scarborough.—Cinema, opposite the Newlands Park Hotel; Wilkinson & Smith, Queen Street. Luxury camp, Redcliffe Point, Gristhorpe (£100,000); Kemps Holiday Centre, Ltd.

Scunthorpe. — Municipal buildings, courts and police buildings, between High Street and Station Road; J. F. Auld, town clerk, Municipal Offices, 34, High Street.

Sheffield.—Houses (576), Handsworth Nurseries estate; E. Cooper, Townend Gleadless. Razor blade factory, Penistone Road and Owlerton Green; W. R. Swann & Co., Ltd., Penn works, Bradfield Road. Factory, offices and garage, Trafalgar Street, Chester Street and Chester Lane; A. Booth & Sons, 19, Cambridge Street.

Smethwick. — Factory, King Street, Marshall & Co.

Staines.—Houses (39), Long Lane, Stanwell; Evans Construction Co., Ltd.

Stanley (Co. DURHAM).—Houses (54), Chaytor Terrace; U.D.C. surveyor.

Stockton-on-Tees. — Houses (20), Colchester Road; E. Benjamin, builder, Victory House, Billingham Road. Houses (32), Hillside Road; Kendrews, Ltd., builders, Norton House estate. Houses, &c., five acres site near South Road; A. E. Hobbs, builder, Hill House, Norton.

Sunderland.—Air raid shelters for the T.C. in connection with A.R.P. (£400,000); borough engineer.

Surrey.—Houses, New Malden (£42,500), schools, Ash Vale, High Ashurst, Stoneleigh, and technical college, Raynes Park (£159,800), for the County E.C.

Swadlincote.—Houses (104), and bungalows, Oversetts site, Newhall; G. A. Taylor, U.D.C. surveyor.

Tredegar.—Houses (36), for the U.D.C.; Edgar Jones, surveyor.

Urmston.—Electricity showrooms, Flixton Road, for Stretford and District Electricity Board; C. Trewavas, clerk, Town Hall, Talbot Road, Stretford.

Wakefield. — Battery service station, near Back Lane; Spence & Hardy. Garage and showrooms, Barnsley Road; South Yorkshire Motors, Ltd.

Wallsend-on-Tyne. — Houses (60) in flats, Rosehill estate; J. H. James, builder, East Farm, High Street East. Houses (40), St. Peter's Road estate; R. A. Gofton and Sons, builders, Front Street, Monkseaton, Whitley Bay.

Walsall.—Houses (42), Coalpool site No. 3a, and infant welfare centre, Countess Street; M. E. Habershon, borough surveyor.

Weymouth.—Houses (26), Weymouth Bay Avenue; Andrews & Andrews.

Whitley. — Council offices (£15,887); U.D.C. surveyor.

Widnes.—Houses (278), Lower House Lane estate; Leyland Construction Co., Ltd., Leyland, Lancashire.

Wolverhampton. — Factory, Wobaston Lane; J. Marsden. Houses (120), Scotlands, Low Hill estate; Taylor & Kelk, builders, Attenborough, Nottinghamshire.

Worcester.—Block of flats, Blockhouse, and houses (144), Tolladine area, for T.C.; borough surveyor.

Workington. — Twelve shops, Pow Street; R. Radcliffe.

Worksop.—Houses (176), Kilton Hill; T. W. Coggan, builder, Kilton Hill.

Yatton.—Houses (69), for Wake & Dean, Ltd.; N. H. N. Darby, architect, 1, The Centre, Weston-super-Mare.

Yorkshire. — Schools, Beadlam, Catterick and Thornaby; J. White, County Hall, Northallerton, Yorkshire.